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TARY : REFORMER : & : ART-LOVER.

CONDUCTED BY

H. H. STATHAM,

FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.



"EVERY man's proper mansion-house, and home, being the theater of his hospitality, the seat of self-fruition, the comfortiest part of his own life, the noblest of his sonne's inheritance, a kind of private princedom, nay, to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned." ♦ ♦ ♦ ♦ ♦

"Architecture can want no commendation, where there are noble men, or noble minds."—SIR HENRY WOTTON. ♦ ♦ ♦

"OUR English word To BUILD is the Anglo-Saxon Bylsan, to confirm, to establish, to make firm and sure and fast, to consolidate, to strengthen; and is applicable to all other things as well as to dwelling-places."—DIVERSIONS OF PURLEY.

"ALWAYS be ready to speak your mind, and a base man will avoid you."—WILLIAM BLAKE. ♦ ♦ ♦ ♦ ♦

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The Chicago Exhibition: a General View.



THE Exhibition which is being held this summer in honour of the four hundredth anniversary of the discovery of the American Continent by Columbus is naturally of the greatest interest to architects all over the world; for herein are contained the efforts of the best known and most distinguished of the American architects, and it is in consequence a gauge of the standard of American contemporary architecture. In future articles we propose to treat of the buildings themselves from an architectural standpoint, but before doing so it will be best to glance shortly at the history of the conception, after the fight for supremacy between New York and Chicago as to which would have the honour of holding the World's Fair. On February 24, 1890, Congress finally decided in favour of Chicago, and immediately various sites were naturally put forward as being most suitable for the purpose of the Exhibition. One site in particular specially commended itself to a certain section. It was situated practically in the city itself, and consisted of a long, narrow

tract of land on the banks of Lake Michigan, and forming the eastern boundary of the city. It was soon demonstrated, however, that this site was quite insufficient for the purpose, and that one of more ample dimensions should be selected. It thus came about that Jackson Park, a large tract of land $2\frac{1}{2}$ miles in length, running north and south, and having an area of some 700 acres, situated to the south-east of the city, and bounded on the east by Lake Michigan itself, was finally selected. It is at a distance of some 7 miles from the heart of the city, but is easily accessible both by land and water, being reached by a special service of trains in 15 minutes. The approach by steamer, although taking longer, is better for approaching the Exhibition for the first time, as one obtains a *coup d'œil* of the buildings which is especially fine, and which is not obtainable by rail.

The site is in many respects an ideal one for such a purpose. The waters of this great inland sea, some 360 miles long and sixty miles across, have been enabled to be utilised for the various necessary purposes of such a large undertaking, and were also available for the creation of lakes and basins in the grounds, and for the display of ornamental fountains. A large portion of the site, whose longitudinal axis runs north and south, was covered with an undergrowth of shrubs and trees, and the remainder of the ground was of a swampy or marshy

character, which of course had to be taken in hand seriously before it could be made presentable as a park in which to place the buildings. The well-known landscape-architect, Mr. Frederick Law Ormsted, who, with his late partner, has laid out several of the more important public parks in America, was consulted, and eventually given the commission of arranging the grounds, and he has shown great skill and taste in transforming what was originally a dreary waste into a really well laid out park, in which the formal and the picturesque are well blended and adapted to the treatment of the surrounding architecture.

It is interesting to note the various preliminary proceedings in connexion with the selection of architects and the procuring of designs. Messrs. Burnham & Root, of Chicago, were consulted in the first place, in conjunction with Mr. Ormsted, the landscape-architect to the Council of Administration, as to the general laying out of the architectural scheme and position of the buildings. Mr. Root unfortunately died soon after the appointment, although not before he had given some valuable assistance in the original conception. It is a curious coincidence that the junior partner of both the original firms who were called in should have died soon after their appointment. It was then decided, and it is an important point for architects, that they should be selected not by public competition but by selection, and

by knowledge of their fitness for the work to be entrusted to them.

Another point militated against public competition, viz., that the time was short, and the amount of work to be performed was large. Harmony in working together was also of the first importance, and it is an interesting fact that many of the architects were trained in Mr. Richard M. Hunt's office, while the others have been connected with men who have worked under him, so that there was every reason to hope for some continuity in their design, and they would also naturally work with harmony under one whom they recognised as their self-elected chief.

A council of these selected architects was established, ten in number, five from New York and the East, and five from the West of America, principally Chicago, and various meetings were held when the designs of the various buildings were allotted. Mr. Hunt, the Royal Gold Medallist of the Royal Institute of British Architects for the present year, and the Nestor of the architectural profession in the States, by common consent was given what was considered the most important design, and which was to form what would really be the great entrance portal of the Exhibition, viz., the Administration Building. To the New York architects were apportioned the principal buildings abutting on the great Court of Honour running west from the Administration Building to the Lake. The Machinery Hall was given to Messrs. Peabody & Stearns, of Boston; the Agricultural Hall to Messrs. MacKim, Mead, & White, of New York; the Manufactures Building to Mr. Geo. B. Post, of New York; the Electricity Building to Messrs. Van Brunt & Home; and the Mines Building to Mr. S. S. Beman, of Chicago.

To the Western architects were given the buildings surrounding the northern picturesquely treated lagoon, which has an island in the centre, rustically treated in an irregular manner, and which is quite independent and different in that respect to the Grand Court of Honour on the south, which is architecturally treated and formal in its character. The Transportation Building was allotted to Messrs. Adler and Sullivan, well known in connexion with steel frame buildings in Chicago; the Horticultural Building to Messrs. Tenney & Munday, of Chicago; the Fisheries Building to Mr. Henry Ives Cobb, of Chicago; and the Art Building to Mr. P. B. Atwood, of Chicago. So much for the general settlement of the designs, of which more anon. Mr. Daniel H. Burnham, as the Chief of Construction, is responsible for the carrying out of the designs in their entirety, and for any constructional works which might be connected with them, such as the iron roof, foundations, &c., in which he has been ably assisted by Mr. Shankland.

Mr. Burnham took up his residence on the grounds in the early part of 1891, and organised his staff, and the buildings have been carried out by him with every deference to the architects' wishes in relation to their designs. Mr. C. B. Atwood, of Chicago, although not amongst the original selected architects, was appointed Designer-in-Chief to the Exhibition, for the large amount of architectural work which always exists in an Exhibition of this kind, such as the terraces, rostral columns, &c., and to him was also entrusted the design of the Railway Terminus to the west of the Administration Building, the peristyle at the extreme east of the Great Court, with the Casino and Music Hall on either side; the Art Building in the northern part of the grounds; and other smaller buildings, such as band-stands, &c.

As has been mentioned, the main or longer axis of the Fair grounds runs practically north and south, and at right-angles to this, therefore striking east and west, is the axis of the Grand Court of Honour, 1,500 ft. in length and about 700 ft. across, around which the great buildings are regularly grouped, and which contains in the centre and running its

whole length into Lake Michigan itself. The great central longitudinal basin is connected at its north-western point with the Minor Canal, which runs north and connects with the picturesquely laid-out lagoon, and is taken south as far as the colonnade which screams the exhibit of live stock, and which serves to connect the southern ends of the Machinery and Agricultural buildings.

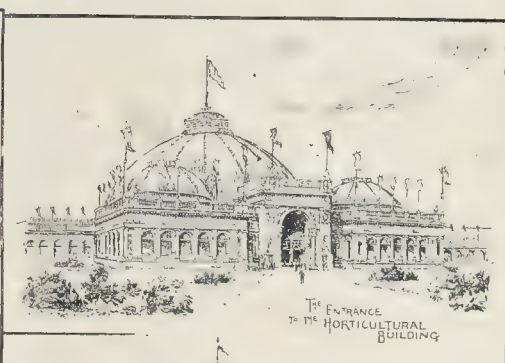
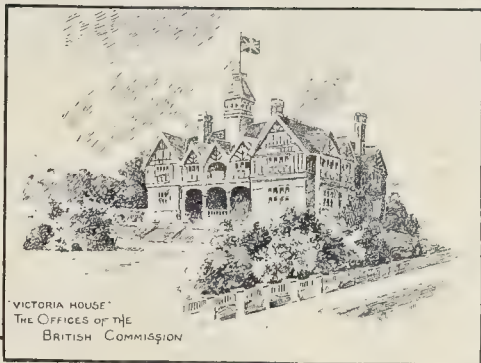
A large tract of land, one mile long and 600 ft. wide, known as the Midway Plaisance, runs from the head of the lagoon in a westerly direction, and contains various side shows and villages of different nations, which, although interesting in themselves, are not architecturally of much importance.

The basin to the Great Court is laid out in an architectural manner with terraces at different levels, and screened from the water itself by a low balustrade, except where the landing-stages occur. Groups of statuary occur at well-defined intervals. Immediately in front of the Administration Building is the Columbian Fountain designed by Mr. F. MacMonies, and erected by him principally at his Paris studio; it follows somewhat on the lines of the great sculptured group at the Paris Exhibition. The centre part is designed as a Medieval barge resting in an oval-shaped piece of water 10 ft. above the level of the main basin, drawn by huge sea-horses disposed near the rim of the basin and spouting foam and water, and ridden by centaurs in various attitudes of urging on the horses. The barge is being propelled on each side by four female figures in a standing position, gracefully pulling large oars with ornamental blades and representing the arts and sciences. At the bow of the barge a figure representing winged Fame with a herald's trumpet announces the approach of the nation, while an allegorical figure of "Time," with his scythe tied to the rudder, steers the barge from the rear; above all, in the centre, rises Columbia, seated. The figure is, perhaps, not so satisfactory as the rest of the design; it is that of a semi-nude young woman leaning forward with an air of expectancy, with her arms resting on the back of the chair, of semi-circular shape. The conception is certainly very fine, and the execution of many of the figures is carried out with a degree of technical skill and feeling worthy of all praise. Of course, French influence naturally predominates; but there is a vigour and a character about the whole which is perhaps not French, and which may be termed American. The whole composition is certainly a fascinating one, and very effective, whether seen in the strong rays of the sunlight or by moonlight, or under the influence of the electric search-light. It is of course entirely a sculptor's group, free from the restraint imposed by architectural forms, and is full of movement and vitality, which qualities are further enhanced by the splash and motion of the large volume of water and of the water jets, which send the water in all directions and give life and movement to the whole conception. It is in such a design and for such a purpose that allegory in its noblest and highest form is a legitimate goal to aim at, and there can be no doubt that Mr. MacMonies has scored a great success.

On either side of this central feature is an electric fountain 60 ft. in diameter. At the easternmost end of the grand basin, that is, the nearest to Lake Michigan, and standing on a pedestal 30 ft. high, is the colossal statue of the Republic by Mr. Daniel Chester French. It is executed in plaster, and gilded, and represents a woman 65 ft. high, clothed in a Grecian robe. Both arms are lifted; the left holds a staff, upon which is placed a Phrygian cap, the symbol of liberty, while in the right is a globe surmounted by an eagle. The lines of the drapery and the attitude of the figure firmly standing on both feet is extremely fine, and almost archaic in its simplicity, thus forming a delightful contrast to the Columbian fountain at the other end of the basin, and grouping most satisfactorily with the symmetrical arrange-

ment of the architecture surrounding it. Beyond this, to the eastward, is the peristyle of Corinthian columns of the Jupiter Stator type, running north and south, and connecting the Casino and Music Hall which face the lake. The columns of this peristyle are arranged four deep, forming three passages, the central one being 15 ft. wide, and the outer ones narrower, the whole conception being founded on Bernini's colonnades in front of St. Peter's at Rome, with the exception that here it is straight on plan. The columns, which are twenty-four in number on each side of the central arch, symbolize the States and Territories of the United States, and the names are carved in the frieze above. In the centre is a triumphal arch resembling somewhat that of the Place du Carrousel at Paris. This forms an entrance to the lake from the basin, and is crowned by a quadriga representing the Triumph of Columbus, who stands in a chariot drawn by four horses, each pair of which is led by a woman standing between them, and apart from the main group, which faces the great court, is a mounted herald blowing a trumpet. The disposition of these figures is novel. Each of the Corinthian columns on either side is crowned by a figure 15 ft. high, representing Eloquence, Music, Navigation, &c., which are continued on the top of the pilasters round the Casino and Music Hall. On either side of the triumphal arch, resting on pedestals on the ground, is a group of statuary representing Navigation and Discovery. The sculpture about this part of the court is somewhat overdone, especially on the peristyle, which has statues on each face, and when seen in perspective the upper part of the statues on the face furthest from the spectator are seen in conjunction with those nearest to him, creating a confused effect. Mr. Atwood himself is dissatisfied with it, and contemplates removing the whole of these statues, thus gaining a much quieter effect, and emphasising the central group.

To return to our plan. To the north of the Administration Building are placed the Mines Building and the Electricity Building, and to the south stands the Machinery Building, of a Spanish Renaissance type. Crossing over the bridge, traversing the canal, which runs north and south, we find to the north the great building dedicated to manufactures and liberal arts, enclosing an area of 30½ acres, and on the south the Agricultural Building, the whole vista being framed by the peristyle described above, which we may mention was originally designed to be semi-circular on plan and to have extended out into the lake, thus forming, we think, a better termination than the one now carried out, but this was abandoned partly on account of the extra expense which would have been entailed in sinking foundations in the lake. The right-angle formed by the junction of the buildings has, however, been softened on each side by the introduction of two circular pavilions, the design being founded on the Temple of Vesta at Tivoli, by Mr. C. B. Atwood. All within the Grand Court has been kept quite formal. Symmetrically disposed are rostral columns surmounted by figures, and around the basin itself and looking into the lagoon are groups of heroic size, representing agriculture, &c., and also a characteristic series of native American wild animals, modelled by Edward Kerneys and A. P. Proctor, the subjects including grizzly bears, the buffalo, the panther, and the Polar bear, &c. These are placed on appropriately designed pedestals at the ends of the bridges. At the south end of the south canal, and forming a finish to it, stands a reproduction of Cleopatra's Needle in Central Park, New York, and beyond is a colonnade of coupled columns resting on a rusticated basement with semi-circular arches, and forming an appropriate screen to the stock-yards beyond. The centre consists of a large semi-circular headed opening with heavily-coffered soffit and the spandrels filled in with draped



Sketches at the Chicago Exhibition.

figures, which, perhaps, are the most unsatisfactory, being coarse and ill-fitting the place they occupy.

All around the great central basin is symmetrical in treatment, but as we proceed along the canal which crosses the great court at right-angles and runs north and south, the stiffness and formality is gradually left behind till the great central wooded lake is reached. The buildings surrounding this lagoon are placed irregularly, and are therefore more in character with the rustic and picturesque treatment of the landscape. On the western side of this lagoon at its southern end is placed the Transportation Building, by Messrs. Adler & Sullivan; it is the most important scheme of exterior colour decoration which has perhaps been attempted in modern times, and will be noticed in detail later on. The buildings in the great court were by mutual consent kept white, for purposes of effect, in order not to interfere with the architectural symmetry of this large area, the interiors of the colonnades alone being decorated, but having no restrictions of this kind on the picturesque lagoon. Messrs. Adler & Sullivan have introduced and carried out in their building a most complete scheme of colour decoration, for which the building has from its inception been specially and appropriately designed. It is not an afterthought in this case, but has been the leading motif in the design; and runs through and influences the character of every particular feature. Immediately to the north of this is the Choral Building, designed by Mr. Whitehouse, of Chicago, polygonal on plan; and still further north on the same side of the lagoon is the Horticultural Building, by Messrs. Tenney & Munday, with its low glazed dome, expressive of a vast greenhouse. This, in its turn is succeeded by the Woman's Building, by Miss Sophia Hayden, of Boston. Architectural gallantry is perhaps an unknown quality, but with all deference to the lady-architects of America, we think that this building shows that however clever and adept women may become as draughtswomen, they never can become architects, but we will notice the building later on. At the head or northern end of the lagoon stands the Illinois State Building, one of the least satisfactory of the State buildings, in a coarse style of Renaissance, and surmounted by a badly-proportioned dome. On the east of the Lake, and to the north of the Manufactures Building, are placed the United States Government Building, which is interesting only as an object-lesson showing the depths to which official architecture can descend, and which it is confidently hoped will sound the death-knell of the system in the States. To the northward of the Government building is the Fisheries Buildings by Henry Ives Cobb, of Chicago, a very satisfactory example of Southern French Romanesque with symmetrically disposed pavilions.

To the north of the latter, and east of the north Pond, which is connected with the lagoon itself, are the various Foreign buildings, including that of Great Britain, to the extreme east on the lake shore front, by Mr. R. W. Edis, in the sixteenth-century manner, with half-timbered upper story, red-tiled roofs, and terra-cotta mullioned windows. On the north shore of the North Pond mentioned above, is the classically designed Art Palace by Mr. C. B. Atwood, of Chicago. The main entrance faces north towards the city, and on either side are two wings covered with small domes. The central portion is covered with a well proportioned dome surmounted by a figure. Filling up the extreme northern portions of the grounds are scattered the various buildings belonging to the States of the Union, and in many cases characteristic of the products and styles prevalent in the States.

Inter-communication between various parts of the grounds is very well organised. The lagoons and basins are well supplied with silent electric launches carry-

ing one swiftly from one part of the grounds to the other, and this is supplemented by an over-head intra-mural railroad, running round the outer portion of the grounds, thus keeping the noise away from the buildings themselves. This element of quiet is very important, and the excellently devised waterways are very important in this respect, besides keeping the grounds in a large measure free from dust.

A comparison with the great Paris Exhibition of 1889, however difficult, seems inevitable, and the first which naturally suggests itself is size, and in this connexion we find that the site covers an area of 1,037 acres, or nearly six times the size of the Paris Exhibition, while it has five times the amount of space covered under roof, and it is said to have cost 19,500,000 dolrs., or about five times that of the Paris Exhibition of 1889. These facts, although interesting to the general public, are, of course, hardly so to architects, who naturally look to the quality of the designs as their means of gauging the advance or otherwise of architectural taste. The designs of the individual buildings are left for further consideration, but it is to the general scheme that we are now referring.

The buildings throughout are constructed, as to their façades, with wooden frames covered with "staff," a material which has been in use in France (and in England is known as fibrous plaster) for exterior purposes, and which is a fibrous plaster composed of Portland cement, plaster of Paris, and hemp fibre; this is cast into moulds and nailed to laths. It is a material which lends itself readily to the needs of the situation in being comparatively cheap, easy of manipulation, and producing an effect which is all that can be desired for a temporary structure and its sculpture. The style adopted for the buildings on the Great Court is some form of Renaissance, and the architects have kept to a uniform height of 60 ft. to the tops of the cornice. The most interesting point we have said is the style adopted. At Paris, it will be remembered, the French architects, although steeped in the principles and practice of Classic tradition, practically laid it aside for the time, and taking two comparatively new materials, such as iron and terra-cotta, gave us a new expression of architecture in boldly allowing their ironwork to show, and filling in behind with the terra-cotta to form the face of the wall. Now we might have expected that the American inventive genius would have developed this idea, and would have carried us still further in this new direction, which architects who have belief in iron as a building material which will give a new phase to our architecture have so long wished to see carried out and exemplified; and one might have expected that the Americans, who do not labour so strongly under tradition as European architects, would have been more easily able to do this. It appears, however, that the great question of cost decided the matter to a large extent, and also the difficulty of getting experienced technical workmen. Paris is a metropolis, and has a staff of skilled workmen, while Chicago, although a great western centre, is comparatively young. Extremes often meet, however, and there does not seem to have been any desire on the part of the youngest of nations to develop anything new for its own sake, but rather to show the nations of the world that she can produce something artistic, something in short which the older nations would hardly expect her to be able to do; and so it came about that what one would have expected to have seen in Paris came to be carried out at Chicago, and the latter city must be congratulated on having found ready at hand a body of men who by their scholarly work have produced a result which we think without doubt would be a credit to the architects of any country. The lasting effect of the results of their labours will be greater than we can at the present time possibly imagine; but we may safely predict that it will do much for the real progress of archi-

itecture, and especially of the arts allied to it in America, and it may possibly be a starting-point on which the Americans will found an expression of their national aspirations for a higher and nobler phase of architectural art.

NOTES.

THE Society for the Protection of Ancient Buildings has issued a pamphlet "Concerning Westminster Abbey," inspired by a rumour in the air that the interior of the Abbey is to be subjected to restoration; a pamphlet which, as usual in the publications of this Society, is a curious mixture of reason and unreasonableness. As usual, the Society informs the public how it has been snubbed—how it has written to the Dean and Chapter for definite information and been refused any; a refusal for which the Society have only themselves to thank. Their acquired character for solemn impertinence in their communications is enough in itself to induce people to refuse to be put through catechisms by them, and as for their plea that they are inquiring on the part of the public, whom empowered them to represent the public? With a good deal of what they say we are in sympathy; certainly we do not wish to see any restoration carried out in the interior of the Abbey; but as to the restoration of the north transept we hold that it is a fine piece of work, and a great improvement to the building, and it replaced nothing that was of any great value. The mischief had been done before; and Mr. Pearson's transept façade is at all events much finer than the work it immediately replaced. The re-casing of the north side is unquestionably a poor piece of work, and it did, as the Society say, "destroy all trace of the handiwork of the Mediaeval masons in this part of the church"; but unless we could see in what state the stonework was before this work was done, it is really impossible to say now whether it was not necessary, and the best that could be done at the time. To compare Wren's towers with modern Gothic work, and say that "they furnish a wholesome lesson to future ages not to attempt the imitation of a past epoch of art," as if there were no difference in knowledge and feeling between the Gothic of Wren and that of Mr. Pearson, is ridiculous on the face of it, and to call the north transept "another example of the dead-alive office work of the modern architect" is almost impudent; its particular merit is that it is remarkably free from that taint, which we admit is only too characteristic of a great deal of modern Gothic work. Nor is the contempt expressed by the Society for the use of the Abbey as a monument house of great men a very noble feeling. It is casting a slight upon associations which are bound up with much of what is great in the history of England; it may have been a mistake to begin with, but we cannot sweep away all these associations at the bidding of a society of dilettanti. However, we quite concur in the opinion expressed in the pamphlet, that as we have at least the interior structure of Westminster Abbey left to us as a genuine Mediaeval work, let us keep that untouched, and confine all operations strictly to necessary repair and cleaning. So far we are with the Society; and if anything further than that is intended, it ought not to be.

THE question of "betterment" came before the House of Commons at the beginning of the week on the third reading of the London Improvements Bill, which deals with the approaches to the Tower Bridge and Vauxhall Bridge. A majority of the Select Committee, which investigated this Bill, sanctioned the principle of betterment, and the House of Commons have also agreed to it, so far as this Bill is concerned. But the President of the Local Government Board has practically invited the House of Lords Committee, which will have to

consider the Bill, to reject the new step. It was admitted that some of the members of the Committee did not approach the question with open minds, being, in fact, as Metropolitan members, pledged to support it. But he urged that if any injustice had been done it could be remedied "in another place." And he further appealed to the House to follow the usual practice, and not interfere with decisions of a Select Committee. Thus, though the House sanctioned the principle of betterment in this case, it can hardly be said to have sanctioned it as a general principle. We have over and over again stated that if this principle is to be used in one place it should apply to every locality, and that it should be sanctioned by the House of Commons as a general principle applicable to the whole of England, if it is to be sanctioned at all.

THE Church of St. Helen, Bishopsgate, which has been undergoing restoration at the hands of Mr. J. L. Pearson, R.A., was reopened to the public on Saturday, June 24. This church, from its position in a "close," behind houses on the north side of Bishopsgate, may not be so well known as some of the City churches, and there is no doubt that the exterior gives but little promise of the interesting interior, but once within its walls the value of a visit becomes evident. The monuments are not only numerous, but many of them of artistic and great historical interest. The origin of what appear to be double naves of almost equal width does not at once appear, but the aisle to the north was originally the nuns' church or choir in connection with the Priory of St. Helen, which occupied ground to the north of the present church, and which is now the site of the Hall of the Leathersellers' Company. This portion of the existing building is noticeable for its series of squints converging on the altar from the exterior; the doorway in the north wall is also in existence, together with two aumbries in which the sacred vessels were kept. The church is undoubtedly one of the most ancient in the City, and the foundation is lost in the uncertainty of antiquity, though it is supposed that in the fourth century a Christian church was built by the Emperor Constantine and dedicated to the memory of his mother Helena on the site of a Pagan temple. The styles in which it is built are various, and denote many alterations and additions from century to century. The lancet windows are probably the work of the first twenty years of the thirteenth century, whilst the two eastern chapels are of the time of Adam Francis, Lord Mayor of London in 1354. The church has been added to from time to time, and the date 1633, which appears on the key-stone of the south door, marks the date of work which is said to have been done by Inigo Jones; to him also are ascribed the porch doors, the former pewing, altar-piece, and communion rails. The pulpit and sounding-board, both of them interesting pieces of work, are probably of an earlier date. The list of monuments is a long one, but amongst others appears the names of Alderman Jhon Robinson, 1599; Alderman Hugh Pemberton, 1500; Mr. Francis Bancroft, 1727; Captain Martin Bond, 1588; Sir Thomas Gresham, 1579; Sir Andrew Judde, 1558; Sir William Pickering, 1574; Sir John Crosby, 1476; and the tomb of Sir John de Oteswich and his wife, which was removed from the Church of St. Martin, Outwich, in 1874. The restorations which have just been completed include sundry constructional work to the walls, the lowering of the church floor to the original level, and the restoration of the ancient roofs and the turret. Rearrangement of the pulpit, choir-stalls, and font, also became necessary, and the provision of a chancel screen with side screens. The rearrangement of the eastern chapels has also been carried out, so that occasional services can be held there. The new chancel screen in oak bids fair to be a fine

piece of work on completion, and the extension of the choir-stalls has been ably treated. The only blots on an otherwise most interesting interior are the roof to the chantry, and the enclosures to the staircase of the west turret. These will doubtless receive attention in the future. The church in its present condition will well repay a visit, and we understand that during the week it is open for visitors between the hours of 11 and 3.30 o'clock.

CONCURRENTLY with some repairs that are being executed by Messrs. Dove Brothers, contractors, a faculty has been granted for removal of bodies from beneath the floor of St. Botolph's, Aldersgate, where, it was stated in evidence, are at least 100 coffins exposed to view, in two vaults, with others below, and a large quantity of human remains outside the vaults, buried without coffins under the flooring. The present church was rebuilt, for the most part, in pursuance of 26 Geo. II., c. 94, on the site of one which had escaped from the Great Fire, and of which we published a view, on May 2, 1885, after the print by West and Toms, of 1737. The church has a mean exterior, except the east front, which is merely a screen wall, erected in 1831 (when the front was set back 8 ft.), in Roman cement, having a pediment with four attached Ionic columns placed in couples upon a high plinth, and having between them a large Palladian window. The three east windows are by James Pierson, 1788. Eight new windows, of stained glass, were executed by Messrs. Ward & Hughes, and unveiled on St. Botolph's Day, 1886. The church is one of the four of its dedication that stood by the old City gates, and it formerly belonged to St. Martin's-le-Grand collegiate church, with which it was annexed by Henry VII., and still appertains, to Westminster Abbey. The Vestry opened the churchyard to the public on October 28, 1880. Since enlarged by the addition, seven years later, of Christ Church burial ground, and (in 1888) of St. Leonard's, Foster-lane, graveyard, it forms a very favourite resort. The west end of St. Botolph's has recently been cleared of some adjoining houses; but the new Post Office buildings on the Angel and Bull-and-Mouth streets site quite overshadow the whole south side of the recreation ground, which lies over the old City ditch. The south boundary wall, built for the most part of ancient rubble masonry, stands upon the Wall of London, discovered in excavating for the new Government Offices. Of that portion of the wall, being Roman work, we gave a detailed account, with sectional view, on May 5, 1888.

WE have before us Dr. Maclean Wilson's Report to the Local Government Board on an inquiry into a very fatal outbreak of diphtheria at Breedy Butts Farm, Thornton, in the Fylde Rural Sanitary District. The examination into the condition of premises and land (as apart from the purely medical inquiry) turned partly on the sanitary condition of the school attended by the children of the district, partly on that of the Breedy Butts Farm and its site and surroundings. In regard to the school we are told that during the whole of last year there was a serious nuisance affecting the premises. A ditch runs along the opposite side of the road which bounds the boys' playground, crosses the road close beside the school gate, and then runs by the side of the master's garden into a dyke or stream which continues its course by the side of the garden. Thus the ditch and the dyke together surround the school grounds on three sides and at a distance of a few yards from the school buildings. That part of the ditch near the boys' playground is covered over, the rest is open.

"Some 500 yards above the school the ditch receives a drain from a slaughter-house, and fre-

quently last year blood and filth from this drain could be seen flowing past the school-house. During the summer months this caused so great a nuisance that the schoolmaster complained to the sanitary inspector, and a notice of abatement was served on the owner of the slaughter-house. The inspector tells me a cesspit was made for the slaughter-house drain, but the overflow from the cesspit was connected with the school ditch, and the nuisance still recurs, though less frequently.

The school closets are also very defective. They are privies; one for the boys and another for the girls, both emptying into one covered midden, which at the time of my visit had evidently not been cleaned out for some time. Besides, a surface drain from the girls' playground runs into the covered midden, and the floor of the boys' privy is saturated with moisture, which evidently soaks through from the midden.

In the farmhouse the case was worse. Two yards from the house is a pump-well 12 or 15 ft. in depth. Five feet from this well is a cesspool made from an old petroleum barrel with a backing of loosely-built bricks. At present the cesspool is half-full of semi-solid filth, and many of the barrel staves are loose and one or two have fallen into the cavity. Two drains from trapped gullies, one on either side of the well, and within 6 ft. of it, run into the cesspool. The following extract from the report shows the ultimate result of the water difficulty—one of the most serious in many a rural neighbourhood:—

"The survivors say that the pump was out of repair, and the water used for all household purposes from last August to December was taken from a rainwater tank, which stands at the back of the house on a brick foundation, and stores the rainwater from the house roof. In December the sanitary officials found this tank, which is of wood and uncovered, in a dirty state and containing a considerable amount of filthy sediment. They condemned the water as showing signs of serious pollution and as unfit for use. Since then water has been carried from a neighbour's house a quarter of a mile away, and I am told that the amount required by the five remaining persons has only been on an average two pailfuls in three days.

It is doubtful if the well at the back door was not sometimes resorted to during last autumn, for one of the farm-servants volunteered the information that the pump could be got to work by pouring water into it.

At the time of my visit the whole house and premises, the persons of the survivors, and the animals in the farm buildings, were in a dirty condition, and I am informed that this was the case last autumn at the time of the outbreak of diphtheria."

THE report on the Health of Liverpool for 1892, issued by Dr. Taylor, Medical Officer of Health for the City and Port, is mainly occupied with subjects which are purely medical, and therefore out of our province. The Report chronicles the erection of a new mortuary, on a site near the old mortuary at the Prince's Dock. A very extensive inspection of street houses appears to be carried on, and it is noteworthy that the proportion of houses reported as "clean" seems to be on the increase in comparison with the number reported "dirty." In the cases of court and alley examinations, where the aim has been to keep the courts and alleys uniformly clean throughout the week, the district inspectors have been instructed that every tenant in each court is to be held responsible for the cleanliness of the court for one week; the inspector records in his visiting book whose turn it is, and informs that tenant. This seems to have worked well, but is there legal power to enforce the acceptance of this system by the tenants? There is power, of course, to fine for an insanitary condition of the premises, but we should think that the rule of making each tenant responsible in turn is only an amicable arrangement, which could not be enforced. It would be as well for any local authorities who may think of imitating the system to be sure of their powers first. The magistrate, we are informed, has rendered great help to the medical department by imposing a small fine in each case in which a prosecution was necessary. "As a consequence there is a marked improvement in the condition of the courts, and also in the apparent willingness of people to cleanse them." A map of Liverpool, on

which the position of typhus and typhoid cases is shown by blue and red spots, is of practical interest. We observe that the typhoid cases, almost without exception, are in narrow streets; only one or two are marked in wide and main thoroughfares.

THE case of the London County Council *v.* Lawrance & Sons, which was decided by a special court of three judges of the Queen's Bench Division last week, is one of much interest and of some importance. It was an appeal against the decision of a magistrate who had refused to commit the respondents under section eighty-five of the Metropolis Local Government Act, 1862, which enacts that the walls of a building erected in a new street shall not be carried beyond a height equal to the distance between the wall and the opposite side. The house as to which the question arose fronted Kensington-road, and had one side in Kensington Court, which was admittedly a new street, and the magistrate held that the building did not fall within the words "erected in a new street." The Queen's Bench Division, however, were unanimously of a contrary opinion, and, therefore, it is laid down—so far as the case contains a principle—that if a corner house newly built has one side in a new street and another in an old one, it is a house "erected in a new street." At the same time, the decision was largely a question of fact, and in order that it shall be applicable to other cases the facts must be the same. It is possible to conceive a house partly in two streets, yet having so small a part in the new street that it might be doubtful if it could reasonably be considered to be erected in a new street. It is obvious that the decision may have curious consequences, since the new street might well be so small that the corner house might be lower than all the other houses in the main street.

THE Municipality of Rome have lately placed an inscribed marble slab upon the front of the Palazzo Verospi, in Rome, where the Shelleys lived for some months, in 1819, and where in June of that year their son William died. In a letter to Peacock (March 23) Shelley describes the Baths as they were then, the ruins standing amidst a luxuriant growth of plants and flowers. It is intended, further, to place a bronze wreath upon his tomb in the Protestant cemetery, and many distinguished persons were invited to take part in these ceremonies. Of the memorial to the poet, designed by Mr. Onslow Ford, which was recently deposited at University College, Oxford, we gave a description in our article upon "Royal Academy Sculpture," of May 28, last year. We hear, too, that a bust of Haydn has been placed in the garden of the house in the Haydnsgasse, Vienna, which Haydn purchased in 1793, and where he composed "The Seasons" and "The Creation." The house, it is stated, remains in its original condition, and has not undergone more than certain necessary repairs. On first coming to London Haydn lodged at Bland's music shop, No. 45, High Holborn, where now stands the First Avenue Hotel; he also lodged in Great Pulteney-street, Soho (No. 33, then John Broadwood's), and at No. 1, Bury-street, St. James's, in which latter street, at No. 35, Mendelssohn lived in the autumn of 1835.

THE work of the Home Arts and Industries Association has been brought forward in an interesting way by the exhibition, which was held from the 22nd to the 26th of June, in the Albert Hall. The work of the Association, now becoming well known, aims at amalgamating and systematising the scattered work of the various craft classes which have sprung up recently in all parts of the country, more with a view to interesting

the youth of the populace and giving them interest in industries that may be carried on at home than to produce art work of a very high order. The work on the part of teacher and taught is almost entirely voluntary and honorary, and is liable to interruption from numerous causes. The report of the Association is interesting, and comments upon the effect that may be expected if the County Councils take action in the direction of technical education. It also publishes extracts from the reports of numerous classes held in connexion with the Association in all parts of the country. Amongst these appear the schools held at Balmoral Castle and Sandringham under the patronage of the Queen and the Princess of Wales. The efforts of the Association to bring the work of all scattered schools under the influence of really artistic control cannot be too highly commended. The recent exhibition occupied the whole of the upper gallery of the Albert Hall, and here in groups appeared the work of the different schools. The quality of the work differed largely, owing to the difference in the general intelligence of the workers and the instruction under which the work has been produced, and in criticising the exhibition we feel that this should not be lost sight of. The work of the Chiswick School of Arts and Crafts, and the Keswick School of Industries was of a refined character. The Ruskin Linen Industry of Keswick also can hardly be treated as the work of amateurs. On the other hand there was a large amount of work which was very interesting and suggestive of pleasure on the part of the worker. The carved work in hardwood of the school at Sandback showed considerable vigour in its treatment, and had doubtless been designed and carried out under the supervision of someone with a feeling for this style of work. An additional interest was added to the exhibition by an increase in the number of practical demonstrations, such as weaving pottery work, leather embossing, &c. We wish the Association every success in its work, the scope for which is amply demonstrated by the strength and weakness of the present exhibition.

ON Friday evening, the 23rd ult., the annual *conversazione* of the Institution of Electrical Engineers was held at the Royal Institute of Painters in Water Colours. The guests were received by the President and Miss Preece. Among those present were Lord Kelvin, Lord Russell, Professor Carey Foster, Professor Kennedy, Professor Hughes, Professor Thompson, Professor Perry, Dr. Hopkinson, Mr. Esson, Mr. Morley, Mr. Crompton, Mr. Hammond, Mr. Ince, Mr. Ferranti, Mr. Harrison, Mr. Madgen, Mr. Dobson, and Mr. Erskine. Electrical engineers seem to shun the electric light in their hours of leisure. The Whitehall is one of the few clubs of any size that is still lit with gas, and on the 23rd the heat became almost intolerable from the same cause. The band of the Royal Horse Guards, under the direction of Mr. Godfrey, performed an excellent programme of music during the evening.

WE may recommend to our friends who are so displeased with the Institute of Architects for meddling with architectural education the account in another column of the proceedings at the Congress of French Architects at Paris, and the prominent place given to the question of the establishment of provincial schools of architecture and to the establishment of a national system of architectural education. The critics of the Institute speak of that body as if it were doing an absurd and unheard-of thing in attempting to meddle with architectural education; as if, in fact, it were a kind of modern insanity. The whole French profession of architecture, at all events, seem to be just as insane on this point as the English

Institute, and worse, they are likely to be aided and abetted by the Government, according to the promises of that Philistine official M. Chas. Yriarte, who represented at the Congress the Department of Public Instruction, and who of course must be supposed henceforth to be entirely without sympathy with or knowledge of art, in spite of the apparent testimony of his writings to the contrary.

LETTER FROM PARIS.

THE most important event of the month for our readers has been the congress of French architects, which however is reported separately, and which we may therefore pass over in this place with merely a reference.

Last year we mentioned the interest aroused by the exhibition of the works of Raffet; and it was natural that the idea should occur of following up this by an exhibition of the drawings of Charlet the predecessor of Raffet in a somewhat similar style (though not nearly equal to him), and who also illustrated the career and battles of Napoleon. The exhibition, in the Galerie Durand Ruel, included also a model for a monument to Charlet by M. Charpentier, consisting of a bust of the artist on a column, against which a soldier leans, looking at a Paris *gamin* playing at the base; a treatment very symbolic of the work of Charlet. As to that work itself, it is a little *denuded* to-day. The drawing of Charlet was careless, the tone and style of his colouring commonplace, and he looks much worse in his original work than in lithographs. Nevertheless the collection is interesting as a whole, and forms a characteristic record of an epoch already far behind us.

The exhibition of the portraits of writers and journalists of the day has been a formidable rival to the Charlet exhibition. More than one hundred portraits have been collected by M. Georges Petit. Among them are five portraits by MM. Bonnat (Victor Hugo, Dumas *Fils*, &c.); a portrait of Baudelaire by Deroy; that of Theodore de Banville, by Dehondencq; that of Feydeau, by Ricard; Edmund About, by Baudry; Henri Rochefort, by Courbet; Yves Guyot, by Roll; Alfred de Musset, by Eugène Lamy; Charles Yriarte, by Weerts; Antonin Proust, by Manet, &c. In sculpture also there is an admirable bust &c. of M. Vacquerie by Dalou. The exhibition is really curious and interesting both in an artistic and historic sense.

The Superior Council of the Académie des Beaux-Arts has awarded the Prix de Paris and the Bourses de Voyage. The Prix de Paris has been given to M. Orange, author of the picture, "Les Défenseurs de Saragossa," exhibited in the Salon of the Champs Elysées. Three Bourses de Voyage have been awarded to sculptors, three to painters, and two to architects. These last have been given to MM. Edouard Baubian and Jules Godefroy, authors (in collaboration) of the restoration of the Château de Rochefoucauld, and to M. Paul Normand, author of "Une Gare Centrale" and "Une Villa."

According to annual custom, the "envois de Rome" have been exhibited at the École des Beaux-Arts. We have on former occasions lamented the insufficient and one-sided line of study of the pupils of the École, a defect which the Académie des Beaux-Arts itself recognises in its annual reports, and we can only repeat the same criticism again, with an exception in favour of the "Enfant Prodigue" of M. Desvambaz, and of which the style and method are broad and sound. This work of a student, which particularly attracted us, reveals a true artistic temperament and promises much for the future. On the other hand, MM. Lavally, Laurent, and Thys have made no progress; and sculpture is in an equally feeble state. The "Légende et le Passé" by M. Convers, is a very vague conception, and the "Orphée" of M. Gasq is merely an academic figure.

There is really more progress among the architectural studies than anywhere else, there is at least evidence of real learning. The "Restauration du Panthéon de Rome" by M. Chédanne (a fourth year student) is a very important work both in an artistic and an archaeological sense. M. Sortais (third year) has exhibited an interesting collection of drawings, among which may be especially mentioned his temple of Vesta at Tivoli. M. Pontremoli (second year) also shows a good collection of work, including drawings of the Temple of Hercules at Cori, the Bevilacqua palace at Verona, and the tomb of Mazzio at

Florence. We must also make special mention of the drawings of M. Eustache (first year) of the Temple of Concord and the Tomb of the Scipios.

There is not much artistic news at this time of year. We may announce that, according to several journals, M. Saglio is to be appointed curator of the Cluny Museum. M. Saglio, who is at present curator of "Objet d'Art" of the Medieaval, Renaissance, and Modern periods at the Louvre, is a very learned archaeologist, and if he is actually appointed, the choice will be unanimously applauded.

We have to record the death of M. Contamin, consulting engineer to the Nord Railway Company, whose name was in everyone's mouth at the time of the works for the 1889 exhibition. M. Contamin, who had been a professor at the École Centrale des Arts et Manufactures, was appointed engineer-in-chief of metallic structures on the Champ de Mars in 1889, and the labour and responsibility of the post, which he filled for two years, told severely on his health, and he never entirely recovered the strain. He has died comparatively young, a victim to professional duty.

THE PICTURESQUE IN CHIMNEYS.

It seems a strange thing that, since the introduction of coal as fuel, little, if anything, has been done in the way of developing the artistic arrangement of chimneys and chimney-pots. It would have naturally occurred to the mind that the increased want of space for flues, for heating apparatus, for steam works, mills, &c., would have led to some architectural treatment corresponding to these various requirements. So far, however, from this having been the case, it is precisely in those countries which have retained the old use of wood fuel that we find original and artistic developments of chimneys and their terminations, whereas, wherever coal has come to be used, anything like an artistic development of the chimney seems to have been abandoned.

Amongst our sketches, Nos. 7, 8, 9 represent chimney terminations from Würzburg and Zellengen, in Bavaria. They probably date no further back than the last century, and are constructed of tile, brick, and morlar. There are almost endless varieties of this kind of chimney-cap to be found in Germany, and they serve to show how a perfectly common-sense treatment of the means to meet an architectural demand always looks well, when there is no attempt to conceal the object, or make it look like something else; and the reason why, in England, the attempt to construct something artistic for coal smoke has been such a complete failure is, that when coal came to be burnt as ordinary fuel, the so-called classical style had become com-

make chimneys look like something else—hence the tall factory chimney became a smoking column, or was concealed within a starved-looking campanile, whereas, in mansions, the chimney-pots became vases, and, in a house in the neighbourhood of Newcastle, we remember

seeing nymphs holding up these vases, the smoke from which had blackened their noses and faces in such a manner as to make the goddesses bear a striking resemblance to chimney-sweeps, showing that "the truth will out," try to conceal it as you may. (See fig. 6.)

Even in that remarkably fine building by Gandon, the Custom House at Dublin, a silly conceit was had recourse to—the chimney-pots are all concealed behind great stone bath-shaped constructions, which, when the smoke rises out of them, seem to suggest to the mind vast turrets of Irish stew. Now, it seems to us that

if, when coal came into general use, the difficulty had been boldly grappled with, we in England

the old domestic architecture of this country offers such magnificent examples of the treatment of chimneys. Nothing on the Continent comes anywhere near our great Tudor stacks, such as one sees at East Basham in Norfolk, Sutton Place in Surrey, Hengrave in Suffolk, &c. (See Fig. 1.) In all our great Tudor mansions, the chimneys are not only ornamentally treated, but are the most ornate features of the whole building. Everything, in fact, was done to accentuate them, so much so that they are often four or five times as large as there was any necessity for, showing that the architects and builders of the day, so far from regarding the chimney as a difficulty, often fell into exaggeration and exuberance in designing these objects, and even in farm-houses and cottages, where a plain and simple treatment was necessary, what striking features the chimneys and chimney stacks present! Look, for instance, at the group Fig. 3, which crowns the roof of a farm house between Harrow and Pinner, those



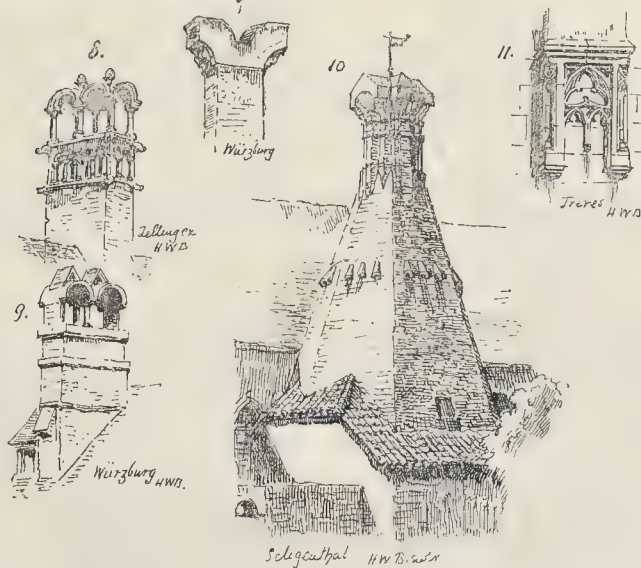
A Tudor Stack.



Farm-house at Harrow.



Charter-house



pletely established, and architects and builders, looking in vain amongst their Greek temples to find any models for what they wanted, tried to

might have hit upon some development which would have supplied the want in an artistic manner. We are led to this supposition because

upon a cottage at Harefield, Fig. 4, or even where, as at the backs of Magdalen College, Fig. 2, and the Charter-house, Fig. 5, they would seem to be built at random, just wherever they were wanted, what strikingly picturesque groups they form! It does not seem to matter much whether they are costly structures erected of cut brick or ashlar stone, whether they are rough brick work, common rubble, or tile and plaster, they are always picturesque and pleasant to the eye. It may be said: "Yes, this is all very well, but these good men had no factory chimneys or great kilns to deal with." But we may see from the treatment of the kiln, over the bakehouse, or kitchen of the Abbey of Seltschthal in Bavaria (see fig. 10), or that given by M. Viollet-le-Duc from the Abbey of Marmoutier, that they would have been quite capable of grappling

with the difficulty in a bold, straightforward way, without attempting to make these features simulate columns or campanile.

Now the only good feature in the way of a chimney termination which the seventeenth or eighteenth century men have handed down to us is the old-fashioned red chimney-pot, which is really thoroughly good in its way; probably it was the most natural and most simple way of meeting a difficulty. It is pleasing in form and good in colour, and does not ape at being something else than it really is, and we cannot help expressing a regret that it is now too often given up for those white terra-cotta pots which, when they are new, are of a most unpleasant colour — closely resembling underdone pie-crust, and when they have been up a few months, look simply shabby and dirty, whereas, the old-fashioned red pot keeps its colour well, and its ruddy hue tells out pleasantly against the sky. We do not thank the modern builder for his "improvements," and, of course, the tin and iron abominations, which are set up to cure smoky chimneys, are most unnecessarily ugly.

It is also a very great question whether the modern arrangement of flues and chimneys, bringing them all up together in stacks between the houses, is advisable. Chimneys ought to be allowed to go where they want to go; they are very like pigs; you can drive these animals the way they want to go, but it is very difficult to get them to run in any other direction, and, in all probability, the extraordinary ingenuity displayed by the modern builder in trying to make his chimneys take up unnatural positions, too often results not only in an unpicturesque appearance, but in that great nuisance, smoke! It is a question, also, whether the practice of projecting the chimney-breast into the house is a good one; it has some advantages, no doubt, but they are more than balanced by its inconveniences. In the first place it is decidedly ugly, as it cuts into the ceiling and walls of a room in a most awkward manner, but this is nothing to its inconvenience. In a country like this, where people change their place of residence about every three years (we believe statistical returns prove "removals" to be even more frequent), it is of great importance that the form and plan of rooms should be as simple as possible, and angles, projections, nooks, and corners should as much as possible be avoided; now these projecting chimney-breasts create four unnecessary angles in every room, leaving two shallow recesses on either side, and it is impossible for anyone who has not had the painful experience of many "moves" to realise the trouble which these shallow recesses give one. In the library they are either too small for the bookcases or they are just too large, and in the one difficulty



Magdalen College, Oxford.

and the angles formed on the ceiling form excellent accommodation for spiders. One advantage in projecting the "breast" outwards is that it can when only required to serve for the flues of upper stories be corbelled out. At Treves, in Germany, the chimneys of many of the Mediaeval houses are carried up the centre of the front gable, and supported upon a bold corbel over the shop front; Fig. 11 is an example which dates evidently from the fourteenth century.

The eighteenth century architects were rather fond of carrying their chimney flues over the arches of windows. Fig. 12 is an example taken from an Adams house at Edinburgh. The practice is scarcely one to be recommended, though at times it may be dictated by convenience and necessity.

Whether we shall ever see the tall factory chimney rendered beautiful is a very doubtful matter. Had the thing been taken up from the first and wrestled with in its infancy something might and probably would have resulted from the attempt; but it is very difficult to convert an old hardened sinner who has been his own master all through a long, ill-spent life. The attempt ought, however, to be made in an honest, straightforward manner, treating the ugly monster as a chimney, and not as a tower, column, or minaret. Surely some development of the old designs which have given us such beautiful objects as the old Tudor stacks and the monastic kitchen chimneys ought to result in at any rate something less ugly than what we are in the habit of seeing done.

H. W. B.

THE CONGRESS OF FRENCH ARCHITECTS.

THE twenty-first session opened at a quarter to three on Monday, June 19, at the Hémicycle of the Ecole des Beaux-Arts, under the presidency of M. Daumet, the president of the Société Centrale des Architectes Français, assisted by MM. Guadet and Achille Hermant, vice-presidents of the Société Centrale, and MM. Roux, Boileau, and Poupinel, secretaries of the same Société. M. Daumet referred, in his opening remarks, to the feelings of concord and unity which alone could enable the architects to contend against the competition of those who were not worthy of the name; and he indicated as a bounden duty of the Congress, to settle the question of district schools and architectural education in the provinces.

The correspondence read included a letter from the Comte de Suzor, of St. Petersburg, giving some interesting details as to the Congress of Russian Architects recently held in conjunction with the artistic and technical exhibitions there, which had proved also a commercial success, owing to the presence of the Czar and of numerous visitors. A letter was also read from an architect of Saint-Dre (Vosges) describing the unhappy situation in which the architects of the Departments were placed by the parasites of the profession.

M. Daumet announced as presidents of the ensuing sittings, M. Lenoir, delegate from the Architectural Society of Nantes; M. Jasson, delegate from the Society of Nancy; M. Journoud, delegate from the Society of Lyons; M. G. Harmand, advocate in the Court of Appeal of Paris; M. Mondet, delegate of the Society of Bordeaux; and M. Batigny, president of the Society of Lille.

There followed next the reading of two communications by M. Lucas, one on "La Propriété Artistique des Œuvres d'Architecture," in reference

to the International Congress held at Milan in 1892; the other on Antwerp and "L'Archéologie en Belgique," in reference to the Historic and Archaeological Congress held at Antwerp in the same year. After the reading of these, the members of the Congress were divided into four committees, of "Enseignement de l'Architecture," "Concours Publiques," "Hygiène," and "Economie Sociale." M. Daumet subsequently announced that the Duc d'Aumale had authorised the throwing open of the Château de Chantilly to the members of the Congress on the afternoon of Wednesday, the 21st. The sitting was adjourned at half-past four.

The second sitting was held on Tuesday, June 20, at 2.30 p.m., at the Amphithéâtre de Construction in the Ecole des Beaux-Arts (at a temperature of 30 deg. Centigrade in the shade). M. Achille Hermant, in the name of M. Daumet, invited M. Lenoir to preside on this occasion.

M. Lenoir then introduced to the meeting M. Fournereau, and after speaking warmly in commendation of his work, called upon him to read the paper announced in the programme, "Explorations Artistiques à Travers l'Indo-Chine," where he had gone in pursuance of a Government Commission, set on foot partly at the instance of M. Charles Garnier. M. Fournereau, who holds a position in connexion with the library of the Ecole des Beaux-Arts, after having recalled the origin of the introduction of the Khmer architecture at Siam by the Brahmins who came from the south of India, then, with the assistance of the oxyhydrogen lantern, led the spectators, as it were, through the ancient capitals of the kingdom of Siam, now a set of ruins covered with luxuriant vegetation; Sokothai, Sanghalok, Phit sanulok, Ayuthia, &c., from which he has brought back many details illustrating the artistic genius of the people in sculpture and architecture. The lecturer then went into the methods of construction employed at Siam, and went through the various elements of construction which went to make up the existing Siamese habitation; houses floating on rafts, houses of Siamese nobility, palaces of the kings, and lastly the remarkable pagodas of Bangkok. In the course of his lecture M. Fournereau gave some curious information in regard the influence of the belief in spirits and tutelary deities, and their relation to the ceremonies gone into in commencing a new building. Thirty-eight pictures were shown in the course of the lecture, those relative to sacred buildings and to the rite of a royal ceremony especially exciting the interest of the audience.

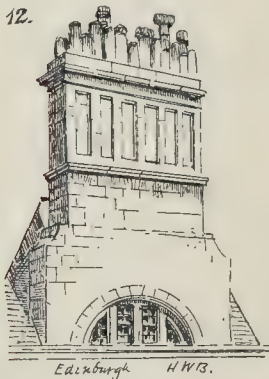
Among the results of the Fournereau mission may be mentioned the presence in the Salon of 1893 of a number of plans and more than six hundred photographs, the material for a large original work on Indo-China.

The Chairman, in thanking the lecturer, assured him of the interest of the meeting and of the Société Centrale in the publication of his work, which will be dedicated to M. Charles Garnier. The Chairman then called on M. Léon Langlois, member of the Société des Ingénieurs Civils, who had already, in a paper read before that Société, gone into the subject of "Théorie des Fermes à pied Encastrés." A black-board, covered with numerous figures, illustrated the rapid exposition made by the lecturer on the general advantages which that essential modification brought about in "Charpente métallique," on the economy resulting from the employment of trellis piers instead of columns, and the greater stability of the former. The Chairman thanked M. Langlois for the precision and clearness with which he had stated this important technical question. The sitting was adjourned at a quarter to five.

Many architects from the provinces went to the meeting at the Société Centrale, where the Committee on Architectural Education in the provinces was sitting, while in another room the provinces was sitting, while in another room the Committee of the "Caisse de Défense Mutuelle des Architectes" was sitting for the consideration of the question as to the fees to be paid for designs made but not carried out. These two meetings came to a close at 6 p.m.

The sitting of Wednesday, the 21st, commenced at 2.30 at the Ecole des Beaux-Arts. An interesting paper by M. Normand on "Homeric Troy" according to the discoveries of Schliemann, substituted for the paper promised by M. Ritter, who was too unwell to appear, was followed by the consideration of the subject of architectural education in the provinces and the formation of district schools. A plan for the constitution of such schools, suggested by the "Société Régionale des Architectes du Nord," had been taken by the Société Centrale as the basis for a report on the subject by all the local societies

12.



Edinburgh H.W.B.

the book-cases have to be cut, whereas in the other two little nooks are left where dust and dirt accumulate. In the dining-room, the side-board never by any chance fits one of them, and the same ill success meets any attempt to make them accommodate drawing-room furniture. Carpets have to be cut into or patched to fit them,

of departments. Eighteen of these societies had sent in reports. Ten of them—the societies of Bordeaux, Bourges, Angers, Blois, Valence, Beauvais, Nantes, Reims, Toulouse, and Grenoble, supported, with some variations of detail, the scheme of the Société Centrale. Lille had made a scheme of its own, drawn up by M. Carlos Batteur, in opposition to the Centrale scheme, and specially intended to represent the state of education in the department du Nord. Lyons demanded a less elevated but more practical and possible standard. Marseilles wished, in consequence of its distance from Paris, to which its pupils could not easily betake themselves, that the local school should be left free to act for itself in the education of architects. Lous-le-Saulnier demanded the creation of a small number of schools, in which theoretic instruction should be completed by attendance in the building "chambers," and in which this combined theoretical and practical instruction should lead up to the attainment of a diploma obligatory on all who would practise. Limoges took much the same view, but wished to await the result of the inquiries of an official commission charged with the organisation of education in the provinces. Nice demanded a compulsory minimum standard of acquirement, with a diploma to be conferred for this minimum, "et non une sorte de reproduction de la deuxième classe d'Architecture de l'Ecole des Beaux-Arts." Rouen contented itself with the idea of a secondary school with certificates to students; and lastly Versailles, in consequence of its proximity to Paris, declined to take any special interest in the question of provincial education. M. Guadet, who was commissioned to report on the scheme, proposed the following resolutions:—

1. That this Congress affirms again the necessity for the creation of provincial schools of architecture in France.

2. That in the organisation of such local schools there should be the same programme of instruction for all, and the same direction of studies.

3. That the studies carried on in local schools should be uniform with those carried on in the second class of the Ecole des Beaux-Arts in Paris, in order that pupils who had passed them with success should be able, if they wished, to proceed direct to the first class of the Ecole des Beaux-Arts.

4. That the Minister of Instruction, aided by a special committee, should be requested to organise these schools.

The discussion on these proposals was long and lively. M. Mondet, of Bordeaux, wished that the public departments should appoint no architects who had not passed with success through the local schools. M. Boileau wished to restrict the education to technical studies, leaving artistic study on one side, while M. Deménieux, on the other hand, wished for a much more complete artistic education. M. Ch. Lucas looked for the solution of the question in the development of the provincial schools already existing; M. Achille Hermant thought that it must be a matter of experience, of experiment, and, in a word, of time; M. Bauer thought that the special function of the provincial schools should be the re-instatement of the ancient schools of art in the provinces. Finally, after various observations from MM. Daumet, Deménieux, Boileau, and the reply of M. Guadet, the four resolutions were put to the vote and carried almost unanimously.

A further resolution was proposed by M. Chas. Lucas in regard to the position which the future schools might occupy as furnishing a constituent element of the Universities which were to be created, and while agreeing with M. Daumet that there was plenty of time for that consideration, he recommended nevertheless that the local schools should be assimilated to the "national" schools, and should bear that title, in order that students who had followed the course with success should have all possible advantages in the shortening of the time required for military service.

The sitting was adjourned at 5 p.m., when the chairman, M. Batigny, announced that those members who wished could have the opportunity of attending at 9 p.m. at the workshop of the Paris Gas Company, to see some experiments in regard to the Ouer gas-burner.

The Friday, the 23rd, (Thursday having been occupied by the excursion to Amiens) the morning was devoted to the business of the "Caisse de Defense Mutuelle," under the presidency of M. Achille Hermant. At the afternoon sitting, held at the Hémicycle des Beaux-Arts at 2.30, under the presidency of M. Mondet, M. Lucas gave the results of the morning meeting. The "C. D. M.," which has been in operation for eight years, counts to-day 336 subscribing members, viz.:—175 Paris architects, 139 architects of departments, and 22 allied societies.

It has a reserve fund of 5,500 francs and 3,000 francs in hand, with an annual revenue of about 5,500 francs from subscriptions and other sources. It has studied and followed in 1892-3 twenty-two legal cases, and has expended since its formation 12,000 francs in law expenses. The Committee was re-elected with the addition of M. Degeorge of Paris and M. Lenoir of Nantes, in place of M. Joly of Paris, deceased, and M. Legendre, of Nantes, resigned. The obituary notice of M. Joly by M. Lucien Etienne followed, which was listened to with much interest. M. Guadet then gave an account, in the name of the Société Centrale, of the work of the Committee on public competitions, and the studies of that Committee with a view to the acceptance of a "Reglementation Générale des Concours Publiques." A spirited discussion followed, in which MM. Roux, Ach. Hermant, A. Normand, Daumet, Deslignieres, and Ch. Lucas, took part, in the course of which reference was made to the unreasonable confusion in the public mind between premiums for competition and the regular fees of the architect in carrying out the work; to the often bad composition of juries in regard to technical knowledge; the incompetence of public bodies, even in the great centres of population; the rules of the Institute of British Architects in regard to competitions, &c. As the result of the discussion the meeting adopted unanimously, with the exception of one dissenting vote, the following resolutions:—

1. That it is desirable that the Government should issue instructions to the various public bodies of the country in regard to the organisation of competitions.

2. That it is equally desirable that the Government should create a permanent *bureau*, a kind of consultation committee, in regard to public competitions.

The sitting was adjourned at 5 p.m.

The last day (Saturday) of the Congress was one of the fullest, and included four meetings, the three first at the Ecole des Beaux-Arts and the fourth at the Hôtel Continental. At 10 a.m., M. Daumet in the chair, took place the reading of the following reports, (1) by M. Hardy, of the archaeological section of the Congrès des Sociétés Savantes of 1893; (2) by M. Rogei, of the section of Economic and Social Science of the same Congress; (3) by M. Thalheimer, acting for M. Deménieux, on the seventeenth meeting of the Sociétés des Beaux-Arts of the Departments. M. Roux, the secretary, then gave a *résumé* of the proceedings of the Congress, and after M. Daumet had expressed his thanks to the readers of papers and to those members who had acted as guides to the monuments of Amiens, the sitting was terminated at 11.30 a.m.

At 1 p.m. took place the distribution of "récompenses" in the Hémicycle des Beaux-Arts, under the presidency of M. Charles Yriarte, as delegate of the Minister of Public Instruction. Among those present on the platform were M. C. Garnier, M. Daumet, M. Guadet, and Mr. R. M. Hunt, who received many congratulations from his friends, on this occasion as well as at the banquet in the evening, on the distinction recently conferred on him by the Royal Institute of British Architects. The chairman, referring to the question of the creation of Local Schools of Architecture, promised that every attention should be given to the subject by the Government. M. Paul Sédille read a report on the "Récompenses" awarded in Architecture and Jurisprudence, and M. Roux made a statement of the merits of the students of the schools and the members of the "personnel du bâtiment" to whom "récompenses" had been awarded. M. Yriarte then, amid the applause of the audience, delivered four medals, decorations awarded by the Ministry of Commerce and Industry, to the following foremen and workmen: M. Audier, mason; M. Dormel, locksmith; M. Guénard, painter; and M. Suzanne, quarryman. These were medals specially given by the State, apparently, under the approbation of the Société Centrale. The complete list of "récompenses" awarded by the Société to architects, students, and workmen, would occupy too much space here; we can only mention the medals to architects given in the section of "Architecture Privée," of which grand medals (silver) were awarded to M. Girault, of Paris, M. Dupire-Rozan, of Roubaix, and M. Pascalon, of Lyons. The architectural jurisprudence medal was awarded to M. Lalanne, of Paris, and a medal was awarded to M. Nodet, of Paris, for "Etudes sur les Monuments Français."

The meeting adjourned at 2.30 p.m. and at 3.30 another meeting was opened in the same room, of the general assembly of Parisian

and provincial members of the Société Centrale, presided over by M. Ach. Hermant. At this meeting it was resolved, in order to give effect to the resolutions voted at the Congress, that the resolutions in regard to architectural instruction in the provinces, and the establishment of local architectural schools, should be forwarded to all the provincial architectural societies with the request that their members should append their signature to them. In regard to the question of "Concours Publiques" it was agreed that the resolution adopted at the Congress should be forwarded to the "Concours" Committee of the Société Centrale, with a request to that committee to prepare a "Code des Concours Publiques." In the course of the discussion which followed, reference was again made to the "Suggestions for the conduct of public competitions" put forth by the Institute of British Architects. The meeting adjourned at 5 p.m.

Between the two meetings, visits were made by members of the Congress to the exhibition of the Envois de Rome, among which special attention was paid to M. Chédanne's drawings of the restoration of the Pantheon, which were explained and commented on by their author and by M. Cholsy.

In the evening, at 7, took place the usual banquet at the Hôtel Continental, at which M. Yriarte presided, assisted by M. Daumet, Mr. R. M. Hunt, Mr. H. Wallon (member of the Senate), M. Emile Trélat, &c. The menu-card was a remarkable design made for the occasion by M. Ch. Normand *filis*, forming a kind of reminiscence of the papers on Homeric Troy, the architecture of Siam, and the monuments of Amiens. After dinner M. Daumet proposed the health of the President of the Republic and of the guests, naming especially M. Yriarte and Mr. R. M. Hunt. M. Yriarte proposed the "personnel du bâtiment" and the workmen and apprentices who had received awards; M. Achille Hermant "The Architects of the Departments," responded to by M. Mondet, President of the Bordeaux Society of Architects. M. Guadet proposed the health of the "lauréats" generally, wishing them plenty of work and health to carry it out, responded to by M. Pérot, Director of the "Ecole Normale Supérieure." Finally M. Charles Lucas proposed the members of the Conseils Judiciaires (of the Société Centrale) and the Caisse de Defense Mutuelle, responded to by M. Albert Martin, member of the "Ordre des Avocats de la Cour d'Appel" of Paris. The proceedings terminated at 11 p.m., bringing this Congress to a close.

We have some separate notes of some of the visits to important buildings made during the Congress, which we must defer till next week.

MEMORIAL BRASS, TEMPLE CHAPEL, TAUNTON.
—A memorial brass, mounted upon polished English alabaster, has just been placed in Temple Chapel, Taunton, in memory of Thomas Sibly, B.A. The work has been carried out by Messrs. Harry Hems & Sons, of Exeter.
GUIDE BOOKS FOR THE HOLIDAYS.—"Walks in the Ardennes," by Percy Lindley (London: 30, Fleet-street), is a small handbook (sold for sixpence) likely to be useful to holiday travellers in the picturesque and interesting Continental border-land known as the Ardennes. It is illustrated by J. F. Weedon, and contains sketches of picturesque buildings and scenery and quaintly-dressed peasants. The book is issued mainly in the interests of the Harwich and "Hook of Holland" route of the Great Eastern Railway Company, and its title must not be taken too literally, for we are told at the outset that "there are several ways of walking" in the Ardennes; "one is by diligence, which walks partly, trots partly, rests a good deal, and altogether is an easy, airy, old-fashioned, and economical way of seeing this region of forest, rock, and river." Other ways of "walking" are by steam-bus, by rail, by cycle, by sculling, and, finally, on foot. A great deal of useful information as to routes is contained in the book.—We have received "Milestone Guides": Vol. II., Northern Section (London: 81, Carter-lane, E.C.). This is a handy little pocket volume for cyclists, pedestrians, or drivers, embracing the northern sections of roads leading from London. It is sold for a shilling, and shows progressively various routes to the North, the Midland, and Eastern Counties, North Wales, and the West of England, the distance from point to point being given in miles and furlongs. A very useful feature of the book is that care has been taken to give information as to hotel and other accommodation on the line of route. The left-hand pages are devoted to the routes, and the right-hand pages are left blank for notes. The book may be had in sections, fitting the waistcoat pocket, at a penny each for each separate group of routes.

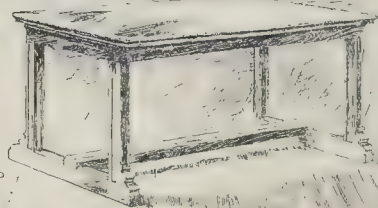


TABLE
In Walnut

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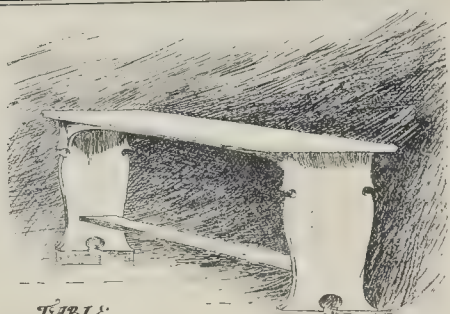


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Plain Furniture.

PLAIN FURNITURE.

THE chairs and tables illustrated were commissions from various clients; they were designed as an attempt to achieve, with an equal expenditure of money and material, better results than are usually obtained by the methods of tradesmen.

To the British public, the wholesale manufacturer is a fetish of no mean reputation; but it may be doubted if the cult is entirely wholesome in its effects.

L. C. C.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon last at Spring-gardens, the Chairman, Mr. John Hutton, presiding.

Tenders.—The following tenders were received, and opened by the Chairman, for works in connexion with raising the southern approach-roads to the Blackwall Tunnel, viz.—Kirk & Randall, 79,863*l.*; and Reed, Blight, & Co., 68,854*l.*

Loans for Wood-Paving.—The Finance Committee reported with reference to various loans to local authorities, two of which loans were wholly or in part for wood paving. In the case of the

Vestry of St. Pancras it was proposed to make the loan for this purpose repayable in five years (which was stated to be the usual period sanctioned for loans for wood paving), while in the case of the Vestry of St. George-the-Martyr, Southwark (where it was stated that Jarrah wood blocks were to be used) seven years was named as the period of repayment. Mr. Nathan Robinson, doughty champion of St. Pancras as he is, naturally felt that his parish was not being fairly treated in this matter, for, he said, in St. Pancras the only wood paving used was Jarrah. Mr. Evan Spicer, Chairman of the Finance Committee, promised that the Committee would look into the question and see that justice was done.

New Issue of Stock.—On the recommendation of the Finance Committee, it was resolved that the Council should take steps for the issue of 1,500,000*l.* Metropolitan Consolidated Stock, carrying interest at 2½ per cent. per annum. This was adopted, and 89*l.* was fixed as the minimum price for tenders for 100*l.* stock. "With a view to encourage the general public to invest in the Council's stock," the Committee reported, "the amount which may be allotted has been reduced to 10*l.*" The new issue will be added to the existing 2½ per cent. stock, which is redeemable on September 1, 1949, or, at the

option of the Council, at any time after March 19, 1920, with one year's notice.

Betterment.—The Parliamentary Committee presented a report, dated June 15, on the London Improvements Bill. They stated that the Committee had passed the Bill authorising the improvements with which the Council had resolved to proceed. The whole discussion practically turned on clause 45, which was thoroughly and exhaustively examined, and was ultimately passed with a few amendments, which were accepted on behalf of the Council. It was important to observe that the Committee passed the clause as one of general application, *i.e.*, Bill, although it was admitted on behalf of the Council that as regarded at least the alteration of Vauxhall-bridge it was not contended that any actual case of betterment was likely to arise. The matter was discussed entirely as one of principle, for it was obvious that while betterment would not practically apply to the Vauxhall-bridge and Woolwich Ferry improvements, even the approach to the Tower-bridge was rather a typical case of an ordinary street improvement than an improvement particularly illustrative of the "betterment" principle.

Mr. Lemon objected to the report being received, and complained that the Parliamentary Committee had not treated the Council with fairness in bringing up such a report without having first communicated the alterations made in the Bill. He contended that the Committee had entirely given up the principle of betterment as understood by the vast majority of the members. The "few amendments" referred to by the Committee were, to his (the speaker's) mind, very vital and important amendments, and he did not consider that the Committee ought to have consented to such amendments without first consulting the Council. He proposed, therefore, that the report be not received.

Mr. B. L. Cohen, M.P., seconded.

Sir John Lubbock, M.P., observed that he should be very sorry if the Council refused to receive the report, for if they did it would minimise the moral effect of the betterment vote in the House of Commons on Monday.

Mr. C. Harrison, Chairman of the Parliamentary Committee, and Mr. McKinnon Wood, the Vice-Chairman of the Committee, denied that the betterment principle had been in any material way "whittled" down by the clauses as agreed to.

Mr. Fletcher Moulton, Q.C., said that some members of the Council had greatly exaggerated the importance of the amendments in the Bill.

After further discussion the amendment was negatived, and the report was adopted.

The Proposed New County Hall and Offices.—The consideration of the report of the Establishment Committee on this question, recommending the acquisition of a site in Parliament-street at a cost of 750,000*l.*, was adjourned for a week.

The Council as its Own Builder.—The Main Drainage Committee's report contained the following paragraph:

"We have to report that the new school building at Crossness has now been completed and opened, and we think that as this has been the first attempt of the Council to erect a building without the intervention of a contractor, the Council will be interested to know the result. The estimate given by the Architect of the cost of the building was 1,800*l.*, while the lowest tender received amounted to 2,300*l.*, or 500*l.* above the estimate. The Council thereupon

gave authority for the work to be carried out by the Architect's department. This has been done, at a total cost of £1,652*l.* In order to make a perfectly fair comparison, it is necessary to remember that work to the amount of £50*l.* was omitted from that tendered for, as it was thought that the cost might reasonably be saved, and there is a further sum of £62*l.* to be deducted for tar-paving work, which has not yet been executed. These omissions reduce the Architect's estimate to £1,688*l.*, and the amount of the lowest tender to £2,188*l.* The work having actually cost £1,652*l.* only, the saving effected by the Council in undertaking the work itself amounts to £536*l.* The cost of supervision at the head offices, it should be added, was not more than it would have been if a contractor had been employed to do the work."

Mr. McDougall, the Chairman of the Committee, in reply to a question by Mr. Beachcroft, said that about sixty children of the workmen at the Crossness pumping station attended the school. There was no other school within two miles. In reply to Mr. Campbell, who said he thought the cost of the building was rather high, and challenged the figures, Mr. McDougall said the work was done by the Main Drainage Committee. Mr. Blashill, the Council's Architect, was satisfied with it, and the Committee were of opinion that the building was a better and a cheaper one than they would have obtained from a contractor. Mr. Emden said he agreed that the work was thoroughly well done, but the cost per child was double that of the schools built by the School Board, and the reason the contractors' tenders obtained in the first instance were above the Architect's estimate was that the Council had then just inserted their peculiar clause into their form of contract, and contractors were chary. Mr. McDougall, in reply, said that it must be remembered that a small school necessarily cost proportionately more per head than a large one, and that the school was larger than required at present.

After transacting other business, the Council adjourned at seven o'clock.

Illustrations.

GLASGOW CATHEDRAL.*

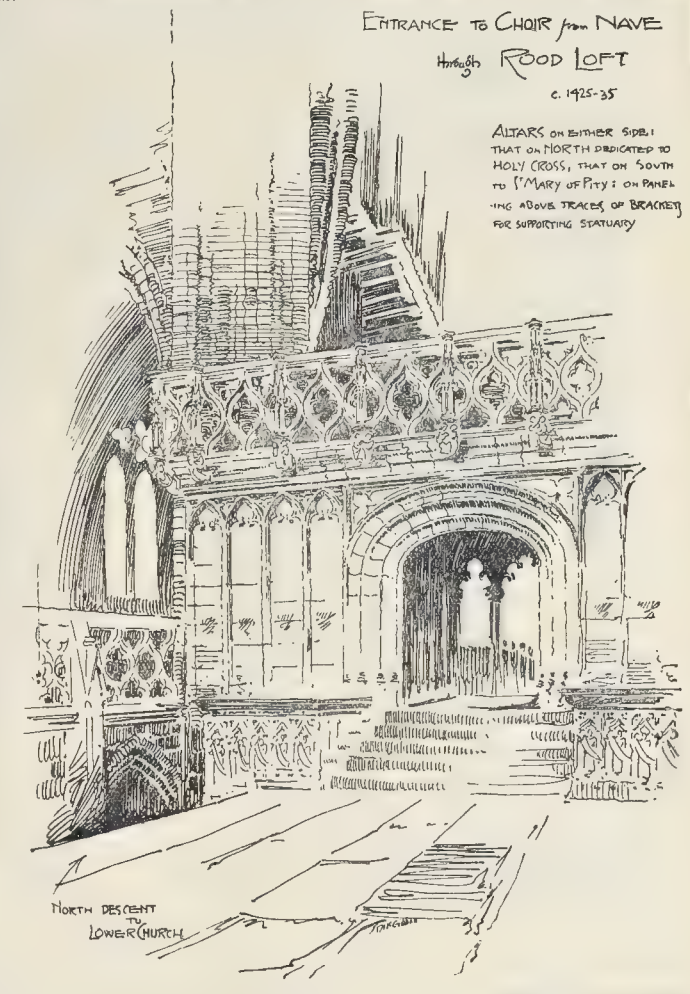
THE founder of the See of Glasgow was St. Kentigern, more familiarly St. Mungo—born at Culross in Fife about the year 514 of a princely family; his mother Thenaw has her name commemorated yet under the corrupt form of St. Enoch.

St. Mungo remained for some time in Glasgow as bishop, but through persecution had to flee to Wales. There, on the banks of the Elwy, he founded a monastery that speedily grew in extent and power. On the re-establishment of peace at home he was recalled; so, resigning his charge to St. Asaph in 573, with a large company of followers, he again settled in Glasgow. There he was visited by the famous St. Columba—the apostle of Scotland—from Iona; at leave-taking they exchanged pastoral staffs. He died about 601, and was buried in the then cathedral. The arms of the City with Tree, Bird, Bell, and Salmon, incorporate legends connected with the miraculous power of her first bishop.

Thereafter in the history of the See there is a blank of some five hundred years—until 1115. Then in the episcopate of Bishop John Achais a new cathedral was begun, and from that time onwards there are many notices of building operations, some but reparation of mishaps, for there was a burning down in 1192.

The fragment in the lower church is all that can be referred to the Transitional period: as to the portion of a church that fragment belongs to, the supposition that it is the eastern termination of the choir south aisle best explains the unusual situation of the founder's tomb, quite removed as it is from the high altar. It also accounts for the well—St. Mungo's Well—that so strangely breaks into the lower church: we may believe that its sanctity forbade disturbance, so there it was allowed to remain, right in the line of the extended Early English aisle wall.

Notwithstanding the impoverished state of the country during the years of the Wars of Independence, the building progressed in spite of certain vicissitudes, such as the following: To build the timber spire by suifrance of Edward I. sixty and forty oaks from certain forests were granted, but the "warlike bishop," Robert



Wishart, more patriot than churchman, diverted these from that sacred use to the manufacturing of mangonels and catapults, wherewith he laid siege to the Castle of Kirkintilloch, then held for the English. That prelate was subsequently taken prisoner, and remained so for over eight years, regaining liberty only after Bannockburn. The wooden spire ultimately erected was struck by lightning and burned down in 1400.

Under Bishop Cameron, who was also Lord Chancellor of Scotland, the See was at its zenith of temporal glory. Besides work done to the Cathedral, he added to the episcopal palace, building the "Great Tower." All of this disappeared with the close of last century. By the recent researches of Archbishop Eyre the location of the thirty altars that then existed has been determined. Six were in the lower church and the sixteen in nave were placed against the west sides of the piers.

In 1450 Cameron's successor, Bishop Turnbull, was instrumental in founding the University of Glasgow. In the episcopate of Bishop Blackader, 1484-1508, the See was elevated to the dignity of an Archbishopric: King James IV. was an honorary Canon at the time. Blackader was the last prelate who added to the fabric, half a century later, and the Roman Catholic occupancy terminated with Bishop Beaton who, in 1560, retired to France, taking with him the chief treasures and records. These were deposited in the Scots' College and partly in the Grand Chartreuse of Paris, and nearly all were hopelessly scattered, if not destroyed, at the Revolution.

The peculiarity of the site,* which slopes rapidly

towards the east, where in former times a stream called the Molendinar flowed, has led to an arrangement which is not to be met elsewhere in this country, viz., the construction of a double church—a lower and an upper—of the same dimensions, extending from the transept eastward. The lower church has been erroneously called a crypt, but the term is inapplicable, the floor of the church being considerably above the level of the ground outside. Moreover, as the Archbishop of Glasgow some time ago pointed out, in none of the ancient documents extant is the word crypt used, but always the phrase "lower church." At the west end, steps lead up to porches at each end of the transept, which have access also from the upper church and towards the east end of the church there are north and south doors, that towards the south having a very elegant small porch. The lower church was used as a church distinct from the upper down to the beginning of the present century, and is the part of the Cathedral so graphically described by Sir Walter Scott in "Rob Roy." At the northeast corner of the lower church a richly moulded and sculptured doorway gives access to the chapter-house, which here occupies a very unusual position, and till within the last few years was not identified as the chapter-house, which was generally supposed to be the apartment immediately over this, now admitted by those best able to judge to be the sacristy. The raised and canopied seat for the dean on the east side, with the inscription over it in which the word *capitulum* occurs, seems conclusive evidence of the purpose

abridged from the notice written by Mr. John Honeyman for the occasion of the visit of the British Association to the Cathedral (of course, with Mr. Honeyman's concurrence).

* The series of illustrations of the Ancient Cathedrals of Scotland which is begun in this issue will be continued, in the first number of each month, until December next. Particulars of this, and of the series of "Cathedrals of England and Wales," which ended in June last, will be found on page xx.

* A considerable portion of the following remarks are



for which this lower apartment was intended, while the spacious ambry in the room above help to identify it as the sacristy. A turret staircase here affords easy communication between the two rooms and between the lower and upper churches at the east end.

To give height to the lower church, the floor of the choir, which is immediately over it, is raised considerably (3 ft.) above the level of the floor of the nave, which again is slightly raised above the level of the ground at the extreme west end of the building. The transept is short and does not project beyond the side aisles at either side; but on the south side an addition seems to have been contemplated, which, however, has only been carried up a little above the level of the choir floor. This building, known as Blackader's Aisle, was erected about 1490, and is a remarkable illustration of the difference between Scottish and English architecture of that period. What it was designed for it is now difficult to imagine, but its length seems to forbid the idea that it was ever intended to be an addition to the transept.

It is proper to mention that within the last fifty years two other adjuncts were extant, viz., a tower at the north-west corner, and at the south-west corner a nondescript building which may possibly have been intended for a tower, but which was never carried up as high as the nave, and was finished with a slated roof and corbel-stepped gables, very much as the chapter-house tower now is. This building was called the "consistory house," and was in use as a library and court-house in 1440. It was evidently an afterthought, and there is nothing to indicate that the original design of the nave contemplated the erection of western towers.

Like every other cathedral, that of Glasgow displays examples of many different styles of architecture. But it is exceptional in this respect, that here a persistent effort has been made to

modify and blend the discordant elements of the various successive styles, so as to preserve simplicity and harmony of general effect. These efforts have been to a large extent successful, and at first sight most people would suppose that the whole building had been erected before the middle of the thirteenth century, whereas there is a considerable difference between the ages of the choir and nave. The chapter-house, which looks quite as old as the church, is really 200 years later, while there is a still greater difference between the age of the choir and that of Blackader's Aisle, which, to most visitors, exhibits no features suggestive of any such difference. It is, indeed, only by a careful examination of the details of the different parts of the structure that the characteristic differences which guide us to their age can be detected.

Standing on the south side of the cathedral, it will be noticed that, from a point about 27 ft. east from the transept, the base running westwards round the nave is entirely different from the base running eastward round the choir. The type of base is quite distinct, and a few people will doubt that the choir base is of later date than that of the nave. In point of fact we find that the portion of wall at the point indicated, i.e., where the different bases join, is of Transitional age, the only fragment of work of that age which remains *in situ*. This will be apparent on viewing the interior, where at this point a Transitional shaft and Transitional vaulting will be found. But here we encounter this difficulty, that while the base of the nave is evidently older than that of the choir, the upper part of the structure is considerably later. The most probable explanation seems to be this, that the nave was designed and partly built before there was any intention of rebuilding the Transitional choir, but when that intention was formed and the design of the present choir

perfected, the operations in the nave were suspended and the whole energies of the workmen were concentrated on the completion of the choir. After that was effected the building of the nave was resumed, but in a somewhat fitful and desultory manner, so that while the base of it may have been laid in the very beginning of the thirteenth century, the clerestory was not reached till the beginning, or more probably the middle, of the fourteenth. Most guide-books tell that the nave was built by Bishop Achaia in 1136. This, of course, is absurd. It is conceivable, but exceedingly improbable, that the nave was founded by Achaia, and that the fragment of Transitional work was part of his choir, but it is more likely that none of the existing work is earlier than the time of Jocelin, c. 1180.

The choir, with its magnificent under church, belongs to the middle, or rather before the middle, of the thirteenth century, during the episcopate of William de Bodington. The chapter-house evidently formed part of the original design, and it is only by examination of the details that one discovers that it was built at a much later period. It was probably built by Bishop William Lauder about 1400, or by Lauder and his successor Cameron, the latter of whom built the sacristy and probably the central tower. The parapet and spire are of later date. The rood screen, generally attributed to Archbishop Blackader, was probably erected by Bishop Cameron. The altars in front of it, which show very inferior design and work, were erected by Blackader, who, as already mentioned, built the adjoining wing south from the transept in the last decade of the fifteenth century, and altered the porches in the transept through which the lower church is reached.

In the lower church the great charm of the general effect is due to the skilful disposition of the piers supporting the floor of the choir. Con-

sidering the limited area of the church, the variety thus produced, both in the grouping of the piers and the grouping of the vaults, is extraordinary, and yet the arrangement, when laid down upon a plan, is seen to be at once simple and symmetrical. Further variety is produced by the treatment of the east end, which displays a clever device for resisting the thrust of the vaulting without buttresses of great projection. The plan of the east end, both of the lower and the upper church, is very peculiar; it consists of a double aisle of four bays running from north to south across the east end of the choir. In both churches each bay in the eastmost of the two aisles was occupied as a chapel, the westmost of the two aisles remaining free as an ambulatory connecting the side aisles of the choir. In the upper church the double aisle is divided by elegant shafts carrying the vaulted roof; but in the lower church the chapels are divided by solid walls with responds towards the westmost aisle, thus forming the abutments above referred to without interfering with the use of the building. These solid walls have been pierced by coupled trefoil-headed openings of rich design, each forming a piscina and credence table for the altar adjoining. The centre couple have been thrown together under one arch to admit the effigy of Bishop Robert Wishart, who was buried there in 1315.

In the choir, again, the most striking architectural feature is undoubtedly the peculiar arrangement of the east end. It will be noticed at once from the circumstance that it necessitated the placing of a pier in the centre of the gable, so carrying round the main arcading of the choir as well as the aisles; while above this we have another peculiarity—a group of four lancets instead of the more common grouping of three or five. Unfortunately the sense of security gained by the introduction of the internal buttresses below (already referred to) seems to have tempted the architect to provide too little abutment for his arches above, with the lamentable result that the walls, especially at the south-east corner, have been thrown considerably off the perpendicular, and seriously rent and disfigured, a source of danger to the structure for which it is now extremely difficult to find an efficient remedy.

After the Reformation Presbyterian and Protestant episcopacy had alternate successes. Fifteen archbishops—among them Spotswoode, the historian, and Leighton, invariably designated "saintly"—continued the succession till the Revolution Settlement of 1688 finally established Presbyterianism in Scotland.

The Cathedral was then formed into three churches, a division wall separating nave from choir. The lower church was only vacated as a place of congregational meeting in 1801 that a worse thing might befall it, for, retained as a place of burial, the windows were built up, mould was brought in and banked to the height of several feet, only railed passages being left; and the vaulting painted a lugubrious black. Happily all such abomination is now gone and the upper church is rid of its former galleries. Unhappily the restorers of 146 were more destructive than the Reformers. The north-western tower then destroyed can now be judged of only by drawings, that in Billings's "Baronial Antiquities," Vol. II., shows it to have been worth preserving.

A blemish of that time that remains is the plaster ceilings, with impossible ribs, of both nave and choir. That of the crossing, of true vault form and most realistic in appearance, does not offend so much; not at all, indeed, until one knows of its falsity. Following upon the "restoration," a most commendable popular enthusiasm to beautify the long-neglected church led to the filling of every window in the edifice with stained glass, excepting only the clearstory of nave and choir. Almost entirely of the Munich School, it is more pictorial than decorative, and a lapse of half a century has proved inferiority of workmanship, apart altogether from any change in the canon of taste. The copious shading of the transparencies has in many places disappeared, and the drawing of faces is often marred. The lower church is certainly unduly darkened by these over-painted windows.

The glory of the Cathedral is undoubtedly the vaulting of the lower church. The central aisle—that alone has in its design anything out of the common—is figured in Scott's "Medieval Architecture," Vol. II., p. 200, and is spoken of as "a work in which the architect seems to have revelled in self-sought perplexities, and to have solved them one after another with singular success. . . . Really one of the most lively and amusing pieces of vaulting I know." Ferguson in his history, Vol. II., p. 87, also

refers to this part of the edifice, and hazards the opinion that "had there been an opening in the centre of the vault (and is by no means clear that one was not originally intended) it would be more like a German double church than anything in England." This is an unlikely theory. Neither seem to have taken particular note of the change in date apparent in the mouldings of this portion.

Mr. T. L. Watson, F.R.I.B.A., in a paper read before the Glasgow Architectural Association, gave the result of his investigations. He showed that this middle portion of the vaulting had been originally designed of the same simple character as that of the side aisles; but its execution was delayed, and when at a late date it came to be constructed a new arrangement, that we now see, was adopted. Mr. Watson showed where the later work had been joined to the earlier, and where the springing of the vaulting rib had been in some cases changed in direction and the original mouldings altered to others of later date. He was inclined to suppose that the vaulting of the central portion was delayed till the completion of the choir clearstory above, as it must have greatly facilitated the work to carry in material for that upper portion into the building and hoist it near to the walls to be built, rather than to raise it at a distance from the clearstory and carry it across the aisles at the high level. This is sufficient to account for the delay in building the central aisle vaulting. The character of the mouldings shows that either a considerable time elapsed between the building of centre and sides, or else the change in style must have been strangely rapid.

Externally the absence of the transepts is the less to be regretted that the apparent length of the building thereby gains. The steeple is some 220 ft. high from nave floor, the grotesque gargoyles throughout attempt a presentiment of something resembling alligators' heads with human heads and figures underneath.

The arrangement of the choir as a place of worship has recently been altered. The communion table now stands where the high altar originally stood, and the floor around has been paved with marble; but the whole arrangement, so different from that seen in English cathedrals, is adapted to the requirements of the Presbyterian forms of worship, which have been considerably modified and improved within the last fifty years. The choir is now, in fact, a Presbyterian parish church, where every available foot of area is required for the accommodation of the congregation.

CERTOSA DI PAVIA.

In the very heart of low-lying Lombardy, its dome and many pinnacles rising above the willows and maize crops, lies the Certosa of Pavia. After tiring days spent in the busy towns of Milan or

Galeazzo Visconti. It was designed by Marco di Campione, who no doubt was responsible for the main portion of the building, which is Gothic, but all the great architects and sculptors of Lombardy worked here. Chief among these were Ambrogio Borgognone and Antonio Amadeo.

The façade, a portion of which is shown in the sketch, was commenced by the former in 1473. It is one of the richest and most beautiful quattrocento fronts in Italy. In general design, however, it is not very satisfactory, the top portion, which was never finished, is bare and poor, and the central portal designed by Agostino Busti is badly proportioned, and fits uncomfortably into its place.

Notwithstanding these defects, however, there are few things in Italy more beautiful than the lower portion of the façade, with its richly sculptured base.

The chapels are richly frescoed, and contain many pictures by Borgognone, and richly-sculptured altars jewelled with precious stones.

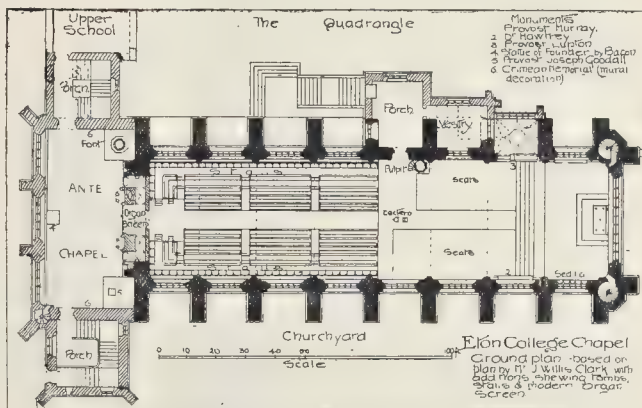
In the right transept is the beautiful monument to Galeazzo Visconti by Galeazzo Pellegrini, and in the left the still more beautiful tomb of Lodovico Sforza and his wife, Beatrice d'Este, by Solari.

It would be impossible to describe all the beautiful objects to be seen in this church; the wonderful carvings of Amadeo on the screens, his figures entwined in foliage in the door jambs, or the beautiful tarsia stalls, the work of Borgognone; so we wander into the cloisters, and among the sweet smelling flowers the "frari" loved so much, still tended carefully; we linger mid the vine-climbing cupids, the choruses of saints and angels that still look down on us from the archivolt of Fontana's masterpiece.

FRANCIS W. BEDFORD.

ETON COLLEGE CHAPEL.

CONSPICUOUS in all views of Eton College is the Chapel, which rises well above the other roofs of the College, and being entirely of stone forms a striking contrast to the red brick which has been used in most of the other buildings. It occupies nearly the whole length of the south side of the Great Quadrangle, and consists of a chapel of eight bays, an ante-chapel of three bays placed across its western end, and three porches, two of which project at either end of the ante-chapel, the third being on the north side, at the fifth bay from the west. This latter is approached by a picturesque flight of steps, forming a charming feature on this side. On the same side, partially set between the buttresses, and immediately adjoining the porch eastward, are a vestry and a chantry chapel founded by Provost Lupton. These also assist in breaking the long lines of the main chapel, and give additional interest to the view from the north. The general plan will be clearly understood on reference to the ground



Genoa, a quiet wander through the now deserted cloisters and chapels of the monastery is indeed a rest and a delight.

Seen in the early morning light, when the shadows are still soft and long, a time when the picturesqueness and beauty of Italian buildings is enhanced a thousandfold, it leaves never-to-be-forgotten memories.

The Monastery was founded in 1396 by Gian

plan here given, and the general grouping of the building is shown in the large view of the exterior which is given in the present number.

Compared with the Chapel at King's College, Cambridge—which was a twin foundation with Eton—the Chapel at Eton, although of smaller dimensions, is more massive in design, and its height is more impressive than at King's, which is decreased to the eye, to a considerable

extent, by its great length. The main chapel—that is from the east end to the organ screen—is about 150 ft. in length, with a breadth of about 40 ft. Each bay has a large five-light window, transomed, with elaborate tracery in the head, and with deeply moulded arches and jambs on the exterior. The buttresses are very massive and project 10 ft. beyond the face of the main wall. Staircase turrets flank the east end, and are crowned with late wooden turrets carrying vanes. The east window is a fine one of nine lights, also transomed midway between the cill and the springing of the tracery. The floor of the chapel is raised about 13 ft. above the level of the quadrangle, hence the steps leading up to the porch on the north side and in the porches of the ante-chapel. This raising of the whole has been happily utilised to give loftiness to the design, and the wall being perfectly plain below the sills of the windows, and finished with a bold plinth mould which is carried round the buttresses, adds much to its dignity. In this respect it is much to be preferred to the more elaborate treatment at King's College Chapel. In the second bay from the east on the north side is the chantry chapel of Provost Lupton, made Provost in 1503, with his monument and an elaborate fan-traceried roof. In the spandrels of the doorway, leading from the chapel to the chantry are his initials R and "rebus," the letters l.u.p. on a "tun" or barrel. His arms are carved on a shield at the end of the central pendant of the vaulting. The vestry, which comes immediately west of Lupton's Chapel, is evidently of earlier date, and had windows on three sides—north, south, and east. Only the north one is glazed, that opposite being blocked, as is also the one on the east side.

Both this and the porch adjoining it have panelled wood ceilings. The ante-chapel built by the famous William of Waynflete, 1479-82, is of later work than the rest of the main chapel. Its dimensions are about 60 ft. in length (north to south), and 30 ft. in breadth. There are three windows in the west wall of five lights, and one at either end set high up in the wall over the porches. A depressed arch divides it from the main chapel, and over (seen from the chapel), is a window of seven lights.

The chapel as it now stands is generally considered to be only a part of a much larger scheme, and to have been built on the site and with the material of an older chapel commenced in 1441. The present building dates from 1448, and was intended to have been of considerably greater length, the part existing being but the choir of the design. This idea seems to have been finally abandoned in Waynflete's time, and the present ante-chapel was built, after the manner of more than one of our University Chapels, of which those at New College and Magdalen are good examples.

The interior, which at one time must have been very magnificent, has been shorn of its ancient fittings. The stained glass throughout also is modern, and of bad design and colour. The present stalls occupy the four western bays of the chapel, and are sixty-eight in number, thirty on either side, and eight return stalls against the organ-screen. The organ-screen is also modern, and of by no means happy design. Over it is the organ, elaborately coloured and clumsy in appearance. There are numerous monuments besides that of Provost Lupton already mentioned. On the north side of the sanctuary is a late monument of Provost Murray, and opposite Lupton's Chapel, against the south wall, a modern monument, with effigy, to the memory of Provost Hawtrey.

In the ante-chapel are a number of monuments to various Provosts, ancient brasses (nineteen are given in Haines' "Mon. Brasses"), the oldest being dated 1489, and memorials taking the form of shields of arms on the north and south walls in memory of those connected with the College who fell in the Crimea. The west face of the organ-screen also forms a memorial for old Etonians killed in the Zulu, Afghan, and Boer Wars. In the north-east angle is the font (modern), behind which are traces of a reredos for a side altar. A similar reredos occupied the corresponding position on the south side.

The main chapel and ante-chapel have low pitched wood roofs, largely restored and renewed. Stone vaulting, if ever contemplated, was never carried out. That an alteration was made, however, in the pitch of the roof is clear from the arch mould of the great east window, the label being at a different curve to the order which carries the tracery. This is visible both inside and outside, and shows in the sketch we give of the east-end taken from the small court south of the hall.



Various stones have been used in the erection of the chapel—Teynton in the lower part of the plinth, Huddleston (Yorkshire) above to the cills of the windows, and Kentish Rag which can be clearly identified by its weathering.



For the details of this interesting feature of the building, we would refer our readers to Mr. J. Willis Clark's account of the "College Buildings of Cambridge and Eton,"* where the subject is most exhaustively treated, and many valuable

details concerning the erection of fabric and the fabric rolls, are given without which a complete idea of the progress of this interesting building is impossible.

The general view of the north side has been taken from the north-west angle of the great quadrangle at the junction of "Upper School" with "Lower School" buildings, and shows the picturesque grouping formed by the Lupton Chantry, the vestry, and the porch with its flight of steps. We also give views of the east end, the tomb and chantry chapel of Provost Lupton, the spandrels from the doorway and his arms from the vaulting, and also the arms of the college from the vaulting of the great gateway on the east side of the quadrangle, which was a portion of Provost Lupton's additions to the college.

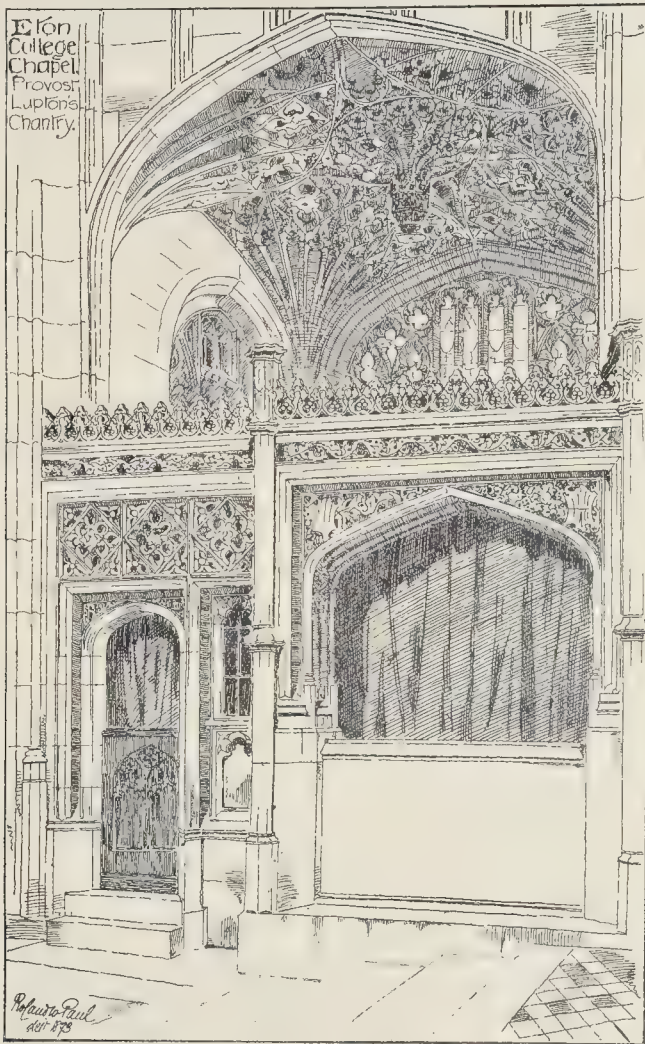
Correspondence.

To the Editor of THE BUILDER.

SOIL-PIPES AND WASTE-PIPES.

SIR,—Mr. Dicksee [see p. 492 of last week's *Builder*] still contends that short waste-pipes, if of small bore, "not only do not require a trap but are better without." He strives to justify this by pretending to quote me as saying:—"The water in the trap is foul and full of microbes." Now I did not say the water in the trap was always foul and full of microbes, but I said, supposing it were so, it would still safeguard the house side of the trap. In general practice the water in the trap, though not clean enough to drink, is often not very dirty, but at other times it will be foul, yet it is harmless, while protective because it is a liquid. This liquid with any microbes in it is being continually sent away by the new water put down, so that in a trap in ordinary use, which always retains sufficient seal, the water, whether clean or foul, is a first class and sufficient safeguard to the interior atmosphere of the

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Eton
College
Chapel.
Provost
Lupton's
Chantry.

The Student's Column.

GEOLOGY—I.

INTRODUCTION.

GEOLGY is one of the most comprehensive of natural sciences. It aims at a complete investigation of the history of the earth, of the beings that have in past times inhabited it, and of the plants which flourished upon it. In unravelling the complicated problems which beset such a vast subject, the geologist seeks aid from almost every other branch of science. It is only by a patient enquiry as to what is taking place at the present day, with reference to the earth, its inhabitants, and its surroundings, that any understanding of the phenomena of geology can be arrived at. Thus the student of the science must be more or less acquainted with astronomy, meteorology, chemistry, mineralogy, physics, dynamics, physical geography, zoology, and botany.

Astronomy is required for geological purposes to impart some idea of the state of our planet in its initial stages; to fix its position in the solar system; and to define its shape, size, motions, and behaviour with its satellite in space. Not only do we gather some account of the earliest history of the earth from this source, but we learn something of the causes which in past geological time, at successive phases, have produced tropical conditions within the frigid zones, and arctic within the temperature. Thus it throws much light on the past distribution of climate over the earth—a phase which has always exercised peculiar fascination for British geologists, in connexion with the circumstances surrounding the advent of man, and many of the higher animals, in these islands—phenomena which took place during the most recent geological period. In a measure, also, astronomy has been used as a geological time-keeper, though we believe that its value in this respect has been very much overrated.

Meteorology, the science of the atmosphere, is drawn upon by the geologist to assist in explaining the weathering of rocks, or denudation of the land; the distribution of and causes of difference in temperature and pressure; of the occurrence and properties of rain, snow, and ice.

Chemistry is of paramount importance in geological inquiry. It enters largely into all speculations as to the embryonic stages of the earth. From information derived from astronomical sources, especially through the medium of spectrum analysis, it is enabled to give us an intelligible idea of the constitution of the gases and vapours of which our planet was originally formed. The composition of the various rocks which make up the crust of the globe is distinctly indicated by chemistry; and their mode of formation also is better understood in proportion, as we are able to interpret the causes and effects of chemical reactions. By way of compensation for the assistance thus received, geology sheds considerable light on many obscure chemical problems, especially in relation to power exercised in facilitating chemical action under enormous pressure, or, what is the same thing, at great depths underground. It has provided chemists also with several inorganic substances from which brilliant discoveries have resulted. As chemistry tells us of what the materials composing the earth's crust are made, so in like manner it explains, in a certain sense, how those materials are by chemical means changed and destroyed, and herein consists a wide application of the science to geology. There is hardly a problem connected with the different phases of volcanic action, more particularly in regard to the immediate causes of that action, that does not derive considerable benefit from chemistry. That science also is laid under contribution in dealing with certain matters connected with the sculpture of surface features of the land with the production of peculiar structures in rocks; with the action of underground water, and with the constitution of waters generally; with the composition of animals and plants, in so far as that has a geological bearing, and with many other subjects in a minor degree.

Mineralogy ought, perhaps, to be considered as merely a branch of geology, yet, in some respects, it has claims as a distinct science. It is useful for our purposes in dealing with the formation of the common minerals composing the earth's crust, of their successful determination, and of their state of aggregation in constituting large rock masses. The state of crystallisation of minerals, their cleavage, the structure of rocks in a limited sense, and other physical properties belong to the domain of mineralogy.

On the other hand, with no trap, the short waste-pipe, even although of small bore, often acts as a dangerous medium for the passage of stinking air and disease-breeding particles into the house.

I cannot believe Mr. Dicksee when, on page 492, he says, as I understand, that he found several waste-pipes fitted up without traps to be quite clean and sweet. He might imagine they were so if they had recently had clean water put down them, and the interior of the pipe had not got time to dry, but with waste-pipes as ordinarily used—although of small bore, as Mr. Dicksee wishes—the atmosphere of the house would be liable to oft-repeated periods of contamination.

In my opinion Mr. Dicksee's plan of fitting up waste-pipes without traps is a very dangerous and unsanitary one. It is unscientific, while the sanitary authorities who allow such a style of work to be carried out in their districts are not doing their duty, in my opinion, to their constituencies.

W. P. BUCHAN.

THE GLASS PAINTING TRADE.

SIR,—Will you kindly allow me to call attention to an inaccuracy in your report of a meeting of the "Glass Painters' Union?" In speaking of a reduction in the price of figure work from 9s. to 6s. per foot, your report says the price was reduced after the work was finished. That was not the case. On reference to my book, I find I had the figure referred to given to me late in the day of May 24, and through an oversight was not told of the reduction until the following morning, when I had barely

* The "inaccuracy" was not ours, at all events.—Ed.

started the job. Now, under the circumstances, which were explained to me at the time, I accepted a modification in the price so that the notification did not, in my case at least, come after the work was executed. Further, I could quote at least six other jobs where I have considered 9s. per foot not enough, and have called attention to it, and in every case I have had more money on them, never once being refused. This occurred in my last job through having a little extra trouble with a small figure. I spoke of the fact, and was at once granted more money. I will greatly oblige me by inserting this letter, as I feel grieved that my work should have been mentioned at all in this matter, as myself and others know that I have at all times a fair price and am satisfied. Threats that have been used towards us who are at the firm have no effect on me, for threats are not calculated to conciliate, but, on the contrary, to aggravate. I imagine I know enough about my department to be able to take care of myself.

J. E. P.

SHRUNK FLOORING BOARDS.

SIR,—Can any of your readers kindly inform me in your next issue if there is any material manufactured for stopping openings between floor boards caused by shrinkage? Filletting is out of the question, owing to the large amount to be treated, and my client declines to do the only right thing, viz., take up and relay.

For the guidance of those who can assist me I may add that the boarding was laid about three years ago, since which time it has seasoned. Average openings about $\frac{1}{2}$ in.

INQUIRER.

Physics has its application in geology in investigating certain matters relating to heat and magnetism. In speculating as to the condition of the earth's interior; and in reference to the contraction and expansion of rocks due to different degrees of heat, and the consequences thereof, especially in regard to the elevation, depression, fracture, and dislocation of the land, and kindred subjects; and the magnetic properties of minerals and rock masses, form part of geological physics.

Dynamics enters into the consideration of earthquakes, volcanoes, the elevation of mountain ranges, and other earth movements. It deals with the immediate effects of pressure; and partly also with the causes of changes in the texture, structure, and composition of rocks; with the action of natural forces at work on the surface of the earth, such as the movement of air, water, and ice, and the effects of these upon the land.

Physical Geography, in its highest sense, must always form an essential part of the geologist's training. Without it he could not comprehend the position or magnitude of the physical features of the surface of the earth, of the direction of rivers, depths of oceans, heights of mountains, shapes of continents, &c. And let not the student imagine that the curriculum of ordinary education is sufficient to give him all that is required on this head for geological purposes. At first sight, physical geography appears to be one of the simplest attributes of geology, but in reality this is by no means the case. Geology starts with the assumption that the student is a good geographer; it describes, physical phenomena in minute detail, the true appreciation of which frequently hinges very materially on the reader's conception of position, direction, distance, and contour of surface features, in small areas, or over a wide tract of country. The real point of lost upon a student who possesses but a limited acquaintance with physical geography, even whilst he thinks he grasps it.

Zoology is useful to the geologist in a variety of ways, principally, however, in assisting him to arrive at a correct estimate of the nature, habits, construction, and systematic position in the animal kingdom of the millions of beings, the remains of which are found entombed in the strata, and which are known to the world by the comprehensive title of "fossils." It is only by studying the anatomy, physiology, and homologies of the animals now living upon the earth that the true nature of these fossils, the majority of which represent extinct types of life, can be rightly determined. This phase of the subject yields to none of the others in its interest and philosophical bearings. By its means we are able to trace the appearance upon earth of successive races of animals, and to picture to ourselves the peculiar forms of life which inhabited it at former remote periods, and which are the progenitors of those now living.

Botany, in like manner, is necessary to elucidate the character of the diversified groups of plants which the rocks tell us once flourished on the earth.

But although geology draws so freely from sister sciences, and inseparably blends them with it, those phases which are proper to itself, and which form the essence of the science, naturally claim the largest share of attention. Let us glance at some of these for a few minutes. One of the most important is the investigation of the materials forming the outer skin or crust of the earth, as apart from their mineralogical and chemical aspects. The geologist in this case shows us how the skeleton of the crust is constructed, whilst the mineralogist and chemist supply a few details as to its composition and anatomy, thus helping to clothe it with flesh, so to speak. The geologist has to gather evidence as to the internal heat of the globe, and draw inferences as to its present condition; he also undertakes the examination of rocks, both in the field and in the laboratory, with a view to illustrate some chapters in the past history of the globe relating to the nature and origin of its physical structure. The question as to whether a rock was (a) laid down or formed originally in the sea, estuary, river, or lake; whether it had (b) once been in a molten condition and ejected from the throat of a volcano, or by other processes brought to the surface of the ground; or whether its original character has been (c) so altered by pressure and chemical means that it was now turned into a totally different class of substance, has to be solved every day by the working geologist. Fortunately it is not now very difficult to determine the broad types of any of these kinds of rock, but there are some which find a middle position, bordering on the one or other types, and these are by no means

easy to determine, even in the hands of the most experienced men. "Structural geology" has most inaptly been termed the "Architecture of the Earth's Crust." It deals with the stratification of beds, and the mode of occurrence of rocks generally; it comprises, not only the building up of the materials, but shows how the edifice has subsequently been subjected to great strains, whereby certain cracks, dislocations, untoward shakes, bendings, and leanings have been produced. Occasionally it indicates the manner in which the walls have collapsed and the roof fallen in, the whole being thrown together in a confused mass, and some of it inverted. The geologist inquires very carefully into the manifestations of volcanic energy, and earthquakes, correlating their general effects; the causes of oscillation of the land through long periods; the circulation of underground water; into the methods whereby the land is sculptured into ravines, valleys, undulations, and plains; the disposal of the Sculptor's chips, and hundreds of other problems.

In short, the science has been conveniently divided into the following chief heads:—1.—Its cosmic aspects; 2.—The investigation of the materials of the earth's substance; 3.—Its dynamics; 4.—Its structure; 5.—The ancient life which inhabited the globe; 6.—The stratified rocks; and 7.—Its physiography.

Now the foregoing has been written in order to acquaint the student with the general scope of the science; we do not wish for one moment to convey the impression that we intend to treat the subject on the lines laid down. Our primary object will be to impart so much geological knowledge to the student of architecture as will be of use to him in the practise of his profession. This aspect of geology is a separate branch of the science which has not hitherto claimed that attention it deserves; it is widely different in its aims to the geology of the university professor, or to that discussed at the meetings of the Geological Society. We are afraid that the alluring problems relating to the purely philosophical bearings of the science are mainly responsible for the neglect of the study of its uses to mankind.

The present series, as previously stated, will deal with "Geology for Architects." Amongst other things it will include a brief outline of so much of pure geology as may be necessary; give some account of the nature and quality of certain materials of construction (though very little will be said respecting building stones, which have already been treated of in this column); of the broad outlines of water supply; of the conditions affecting good and bad foundations; of road formation; of the different kinds of geological maps; and of certain simple, but useful, experiments. A principal feature will be the discussion of the causes which have led to the present types of scenery, and to connect the latter with the structure of the rocks composing it. The styles of geological architecture are as diverse as can well be, and in describing and illustrating the salient points concerning the cause and effect of these styles, we hope to induce the student to pay such attention to the design of buildings to occupy certain sites, that they may be in harmony, or contrast, as the case may be, with the surrounding structures of nature.

GENERAL BUILDING NEWS.

DALY'S THEATRE, CRANBOURNE-STREET.—This new theatre, which is situate within a few yards of Leicester-square, was opened on Tuesday last. It has been built from the plans of Mr. Spencer Chadwick, architect. We published a drawing of the elevation, together with plan, section, and description, in the *Builder* for November 14, 1891. The builder was Mr. Frank Kirk.

HOSPITAL FOR SICK CHILDREN, GREAT ORMOND-STREET.—The new wing of this hospital, which was opened last Saturday by the Prince and Princess of Wales, doubles the ward accommodation for patients, for whom there is now room for 192 cots. It provides proper and convenient administrative offices, which had hitherto been inconveniently placed in a separate house adjoining, and also gives dwelling rooms for the lady superintendent, and provides accommodation for the lady pupils, the sisters and nurses, and the numerous servants necessary in so large a building, who were formerly dispersed in separate buildings rented for the purpose. The new building was commenced in 1890 from the plans and designs of Mr. Charles Barry, who was appointed architect for the work, and who was instructed and assisted by a special committee, of which the principal consulting physicians and surgeons were members, and whose professional information and suggestions were naturally of the utmost value in perfecting the plans of the architect. The new building is entirely fire-

proof in its construction, the floors being constructed on the now well-known system of Messrs. Fawcett. The utmost attention has naturally been given to the important subjects of ventilation and sanitary appliances. The contractor for the work was Mr. Mitchell, of Dulwich, and Mr. H. W. Hogan was clerk of works. The cost, exclusive of furnishing, has been 32,000l. We published a view and plans of the new wing in the *Builder* for Feb. 1, 1890.

NEW CATHOLIC CHURCH, CARLISLE.—The new Catholic church in Carlisle was recently opened. The *Carlisle Patriot* says that the new church, like the one it supplants, is dedicated to Our Lady and St. Joseph, and is a building of the Perpendicular style, occupying one of the finest sites in the city. The architects, Messrs. Dunn, Hansom, & Dunn, of Newcastle-upon-Tyne, have made the most of the site at their disposal. The great feature of the exterior of the edifice is the battlemented tower at the west end of the church, the tower being surmounted by a turret, rising to a height of 8 ft. above the battlements. The other most striking feature of the exterior is the elaborate tracery of the windows, of which there is one in each bay. The exterior is of red local stone, relieved by the Bath stone of which the tracery of the windows is composed. There is a large clearstory, and the aisle roofs are almost flat. The interior of the church consists of a nave, north and south aisles, chancel, north and south chapels, while alongside the chancel are two sacristies. The interior is lined with Bath stone throughout, with the exception of the arcade piers and responds, which are of Corncockle (Dumfriesshire) stone, which is of a rich red hue, and presents a pleasing contrast to the pervading white stone. The pillars are alternately octagonal and quatrefoil on plan. The label-moulds of the arcade are stopped with carved angles, and the wood principals of the roof also spring from carved angles. The roof is of pitch-pine throughout, and is panelled and enriched with tracery. At the west end of the south aisle, but separated from the aisle by an archway, is the baptistery. The ceiling is vaulted, and is relieved with moulded ribs, with carved bosses at the intersection of the ribs. At the west end of the church, in the base of the tower, is a gallery, with sitting accommodation for about fifty persons. The tower arch forms a striking feature of the interior, reaching up to the ceiling of the nave. Through the arch is seen the large west window. Much care has been expended upon the arrangement and decoration of the chancel. The total internal length of the church from west to east is 122 ft., and the total breadth across nave and aisles 52 ft. There is sitting accommodation for about 700 worshippers. The acoustic properties are stated to be excellent. There is placed in the tower a bell, weighing 6 cwt., which has been cast by Messrs. Taylor & Co., of Loughborough. The total cost of the church and rectory, exclusive of the expense of enclosing the ground, &c., is about 12,000l. We published a view of the new church and rectory in the *Builder* for April 22 last.

POOR-LAW OFFICES, CROYDON.—A new Board-Room, Union Offices, Rural Sanitary Offices, and Out-Relief Station erected at Mayday-road, Croydon, for the Guardians of the Croydon Union, by Mr. Alfred Bullock, builder, of Croydon, at a cost of about 7,000l., were formally opened on Wednesday, the 21st ult., by Mr. O. W. Berry, Chairman of the Board. The Mayor and the Vicar of Croydon, and other gentlemen in official positions, attended on the occasion, and the new buildings, with their stone dressings, and are roofed with Broseley tiles. The architect is Mr. Frederick West, of Croydon.

WESLEYAN CHAPEL, LEEDS.—On the 24th ult. the memorial-stones of a new chapel, to be known as Trinity Wesleyan Chapel, were laid in Roundhay-road, Leeds. The site of the new chapel is surrounded on all sides by wide streets. A school-room, infants' room, and ten class-rooms were built and opened in 1890, at a cost of 3,500l. 12s. 2d., including 1,000l. for the site. The large room has been used both as a school and mission room, but it is now too small for that purpose. The new chapel, which will be built of pressed bricks in the Italian style, from the designs and under the superintendence of Mr. G. F. Danby, architect, Leeds, will be 80 ft. long, 56 ft. wide, and 38 ft. to the ceiling. The entrance to the ground floor will be by a central doorway, leading through lobbies into an inner vestibule 31 ft. long and 8 ft. wide. Two staircases (which also will have windows) with the vestibule) with stone staircases will lead up to the gallery. The pulpit will be placed in the centre at one end, with the choir seats on either side, and the chancel will be separated from the rest of the chapel by a moulded and carved stone arch, supported on granite columns, with carved caps and bases. The windows will be glazed with leaded lights, and the ceiling will be coved, panelled, and enriched in plaster. All the doors will be made to open outwards. A minister's vestry, church parlour, or ladies' workroom, will be arranged between the present schoolroom and the chapel, with an additional staircase to admit the scholars to the gallery. The internal woodwork will be of pitch pine and oak, and the building will be warmed on the low pressure hot-water system. The cost of the part now being built will be 4,470l. 10s. 6d. The contracts have been given to

Mr. Thomas Hannam, builder; Mr. Joseph James, joiner; Messrs. Lazenby & Co., plumbers; Mr. T. Moore, plasterer; and Messrs. J. and H. Smith, ironwork and warming.

ALTERATIONS TO WESLEYAN CHAPEL, LEEDS.—On the 24th ult. the Wesleyan Chapel at Woodhouse-street, Leeds, was reopened, after having been altered and adapted to modern requirements of public worship. The whole of the enclosed pews on the ground and gallery floors have been cleared away and replaced by more comfortable seats, with moulded bench ends. The high pulpit has given place to a commodious rostrum. Two entrance porches have been erected, providing better egress from the chapel, and an additional staircase has been erected at the rear of the building. The organ, which before was placed behind the pulpit, has been removed, and a new organ has been erected in a chamber built for the purpose on one side of the pulpit. The ventilation and lighting have also been attended to, and the chapel has been decorated and painted. The whole of the woodwork is of pitch pine. The cost of the alterations has been about 1,200*l*. The various works have been carried out from the designs and under the superintendence of Mr. G. F. Danby, architect, Leeds; by Mr. Thomas Hannam, builder; Messrs. Mason & Son, joiners; and Messrs. Carter & Frankland, painters and decorators.

NEW HALL FOR HERIOT'S HOSPITAL SCHOOL, EDINBURGH.—At Edinburgh Dean of Guild Court on the 22nd ult., a warrant was granted, says the *Scotsman*, to the Governors of George Heriot's Hospital for the erection of a new examination hall for Heriot's Hospital School. The hall is to be built to the north-west of the Hospital, within the old city wall, on ground until now used by the Edinburgh Water Trustees. The building will consist of a large hall, lecture-room, preparation-rooms, retiring-rooms, and cloak-rooms. In plan it will be cruciform, the centre being occupied by the hall proper. This hall, which runs north and south, is to be 85 ft. long by 51 ft. broad and 46 ft. high. It is lighted by large windows at either end and sides, and is roofed in by an open-timbered roof having vaulted principals and open lighted lanterns running the whole length of the ridge. Over the west entrance, a gallery, which may be turned into a lecture hall, is situated, while opposite this and above the preparation and retiring rooms is placed a smaller lecture room, 50 ft. by 22 ft., which can also be utilised as a gallery. When all the space is used the hall will seat more than 1,500 boys. Outwardly the hall has been designed in strict sympathy with the general style of the Hospital building. The principal front looks eastward towards the Hospital, and its dominant feature is a square tower rising to a height of about 70 ft. In this is placed the entrance to the platform and small lecture-room, while to either side of the projection in which the tower stands are placed relief exits for the main hall. The tower is flanked by four small pedimented windows on either side, and surmounted by an embased cope, terminating in circular turrets at the angles. Recessed from this portion the north and south ends of the main hall stand out, and are broken up by the large windows lighting the hall. The building will be heated and ventilated by steam, and lighted by electricity from the present technical department of the school. The design is by Mr. Donald A. Gow, architect and superintendent of works to the Trust, and the building is to be ready for use by the end of the session 1893-94. The cost will be between 8,000*l*. and 9,000*l*.

PROPOSED NEW CHURCH, OBAN.—It is intended to erect a new parish church at Oban. The proposed new building will be in the Gothic style, the most commanding feature being the tower and belfry, which is to be finished at the top with four ornamental pinnacles. It will be seated to accommodate 450 people. The estimated cost is over 3,000*l*. It is to be erected from designs by Mr. Alexander Shairp, architect, Oban, and the principal contracts have been secured by Messrs. D. & J. Macdougall, builders, Oban.

NEW BUILDINGS AT GLASGOW.—At the Glasgow Dean of Guild Court on the 22nd ult., fifteen applications for authority to erect new buildings in the city were granted. The School Board of Govan gave permission to build a new school in Allison-street; Messrs. Moss, Thornton, & Kirk, to make alterations on the Scotia Theatre of Varieties; the Town Council of Glasgow, to erect tramway stables in Maryhill; the Scottish Temperance League, to take down existing buildings on the east side of Hope-street and erect new buildings there; and the trustees of the Grove-street Home Mission Institute, to add to their property in Grove-street and Kelvin-street.

NEW INFIRMARY, HALIFAX.—The memorial-stone of the new infirmary for Halifax was laid by the Earl of Lathom on the 17th ult. The main administration block faces Free School-lane, and communicates with the main corridor of the infirmary, and the surgical block (this having separate access from Free School-lane) by a broad corridor running north and south. Upon the ground floor are placed the Board-room, clerks' room, waiting-room, for visitors, and accommodation for the matron and the house surgeons, with all the necessary lavatory arrangements. Upon the floor above

are chiefly day rooms for nurses and probationers, one wing being appropriated to the bedrooms of the matron and her assistant. Upon the second and third floors provision has been made for the nurses' bedrooms, until such time as the whole scheme can be completed, and a separate Nurses' Home built. All these rooms may be reached from the main corridor of the hospital by a staircase giving access to the corridor on the first floor level, enabling the nurses to reach their dormitories without going through the ground floor corridor. The bath-rooms, lavatories, &c., are situated at the extremity of the two wings, and are cut off from the living rooms by ventilating passages. At the intersection of the main corridors on the ground floor is a central hall. The kitchens are situated at this point, from which the food will be distributed from a large serving room. The stores for grocery and linen, and the other rooms which require a central situation, are grouped round the hall. The servants will be accommodated in the central block upon the first floor with their own separate stair. Communication with the basement below, in which are the cellars for stores, will be by a large lift and staircase. The houses for the porters and the engineer are placed in the basement, and a covered way leads out from the kitchen to the laundry and wash-house. The pavilions, containing the wards for in-patients, are placed north and south of a wide corridor running right and left from the central hall. Each of these pavilions has a large ward for twenty beds, lighted upon both sides, with double fireplaces in the centre, aided in severe weather by steam pipes and heaters. In each pavilion is also a small ward of two beds for special cases, nurses' duty rooms, and stores, and the necessary bath-rooms, lavatories, and sanitary arrangements. The latter are placed at the ends of the pavilions, and are separated by ventilating passages. The pavilions on the south side nearest Free School-lane will have, in addition, a day room, lighted by a bay window on the sunny side. The ward floors will be of oak, and the walls are to be covered with impervious cement carried round the arched ceiling, and all angles rounded. The pavilions contain only one floor. The large area of the site permits of the wards being detached. Each ward, being raised above the surface of the ground, has free circulation of the air on all sides. The operating theatre is placed upon the north side of the main corridor, and contains the operating-room, lighted from the north, patients' waiting-rooms on each side of the connecting corridor, and lavatories. The mortuary is placed in an isolated building on the north-west. The rapid slope of the site has been difficult to contend with. The main corridor falls with the slope of the land, to enable the pavilions to be confined to one story; but the main floor of the administration block, the surgical block, and kitchen department, with the corridor connecting them with the central hall, are all at one uniform level. The design is a free treatment of the Renaissance style. The main front of the administration block consists of two projecting wings, a central porch, and mullioned windows. Three dormer windows are flanked on either side by large gables, and the whole is intended ultimately to be crowned by a clock turret. The ends of the wards fronting Free School-lane will have oriel windows to the day rooms. The construction of the buildings were put in by Messrs. J. Charnock & Sons, during 1891 and 1892; the contracts for the superstructure are let to separate local tradesmen, and the work is now proceeding under the supervision of the architects, Messrs. Worthington & Son, of Manchester, Mr. Richard Charnock acting as clerk of the works. The contractors for the work are as follows:—Masonry, &c., Mr. W. Sutcliffe; carpentry, Messrs. S. Wadsworth & Sons; ironwork, Mr. John Berry; plumbing, Messrs. Naylor & Son; slating and plastering, Messrs. Rushworth & Firth; concreting, Messrs. G. Greenwood & Sons; painting, Messrs. J. Binns & Sons.

SCHOOLS, GORSENIEN.—Board Schools to accommodate 450 children have just been opened at Gorseien, the architect being Mr. J. B. Morgan, of Llanelly, and the builders Messrs. Thomas Watkins & Co., of Swansea.

RESTORATION OF PENYMYNYDD CHURCH, FLINTSHIRE.—The church of Penymynydd, in the parish of Hawarden, which has been undergoing re-decoration and restoration, was reopened on the 24th ult. The work of restoration has been carried out by Mr. Glyn Evans, of Chester.

THE NEW ART GALLERIES FOR GLASGOW.—An application was made at the Glasgow Dean of Guild Court on the 22nd ult. by the Association for the Promotion of Art and Music in the City for permission to erect new Art Galleries in Kelvingrove Park. The applicants had the consent of the Lord Provost, Magistrates, and Town Council. Mr. A. F. Baird, writer, who appeared for the Association, explained that on the termination of the Glasgow International Exhibition of 1888 there was a surplus of 46,000*l*., and the Association, which was now before the Court, was formed for the purpose of applying that surplus in the erection of public art galleries, a concert hall, and museum. By arrangement with the Corporation, it was agreed that the latter should grant a site for the buildings in Kelvingrove Park on condition that a sum at least equal to the surplus was raised by subscription, and also that the plans of the buildings should be

approved by the Town Council. The Association had now collected the sum of 65,000*l*. by subscription, and the plans had received the approval of the Town Council and the City Engineer, so that both conditions had been fulfilled. The present application was for authority to erect the basement floor of the proposed buildings, which was all it was intended to do in the meantime. The application was granted. The architects of the new buildings are Messrs. Simpson & Milner-Allen, of London.

RESTORATION OF ST. HELEN'S CHURCH, BISHOPSGATE.—On the 24th ult. the Bishop of London reopened, after restoration, the Church of St. Helen, Bishopsgate. The reopened church is one of the oldest in the City, and now forms the parish church of the united parishes of St. Helen and St. Martin Outwich. It was built about 1212 on the site of a much earlier church. The architect for the restoration has been Mr. J. L. Pearson.

WESLEYAN MISSION HALL FOR WOLVERHAMPTON.—A Wesleyan Mission Hall is being erected in Pountney-street, Wolverhampton. The buildings will include an assembly room for 300 people, and two vestries behind which may be used as class-rooms. The assembly room will be 50 ft. by 28 ft., and 14 ft. high. Mr. Jones is the builder, and Mr. Johnson, of Wolverhampton, the architect.

DISPENSARY, STOURBRIDGE.—On the 19th ult. the foundation stone of a new dispensary, to be erected in Worcester-street, Stourbridge, was laid by Viscountess Cobham. The building is being erected by Mr. North, of Stourbridge, from plans by Mr. T. Grazebrook of Dudley and Stourbridge. The cost will be 1,100*l*, exclusive of the site.

SANITARY AND ENGINEERING NEWS.

EDINBURGH WATER SUPPLY.—A special meeting of the Edinburgh and District Water Trust was held on the 22nd ult., to consider the report of the Works Committee, recommending that steps be taken for procuring an additional supply of water, and that the Manor scheme should be adopted. The Lord Provost moved the approval of the report, which was seconded by Baile Archibald. After considerable discussion, this motion was withdrawn in favour of one by Mr. Colston, which was unanimously agreed to, and which was to the effect that general approval be given to the report, but that consideration of it be delayed in order to admit of an inspection of the various sources of supply, and to allow of further information being obtained as to the engineering and other questions. The *Scotsman*, of the 23rd ult., gave full details of the proposals, which were made by the Works Committee of the Trust in endorsement of a report by Messrs. Gale, Hill, and Mansergh, advisory engineers. An expenditure of nearly 750,000*l*. is contemplated by the Manor scheme.

PROPOSED WATERWORKS, FRODSHAM, GRESHIRE.—On the 14th ult. Colonel J. O. Halsted, R.E., Local Government Board Inspector, held an inquiry at Frodsham Town Hall, with reference to the application of the Runcorn Rural Sanitary Authority for sanction to borrow 3,800*l*. for constructing waterworks in Frodsham township. Mr. John Ashton, clerk to the Rural Sanitary Authority, explained that the annual cost of the scheme was estimated at 430*l*., including interest and instalment. There were 506 houses on the pipe line within the area proposed. Application was also made by the Sanitary Authority to spend 1,500*l*. in the township of Hull and Appleton for sewerage works.

THE SYSTEMATIC CLEANSING OF DRAINS.—At a recent meeting of the Bexley Local Board, Mr. E. Reeve Boulter, the Surveyor, submitted a report on this subject. He said the cleansing of house drains is a matter which requires the serious attention of all Sanitary Authorities. The cleansing of drains means not only the removal of solid obstruction matter, but also the prevention of gaseous accumulations. Many persons labour under the impression that when a drain is once laid no further attention is required in connexion with it. They would, however, ridicule the idea if it was suggested that they should apply the same principle to the chimneys of their houses. These are periodically cleaned, and surely drains should have similar attention. Only very recently (within the last few months), in connecting a drain with the sewer, the drain in question having been in use barely six months, it was found that the disconnecting trap was completely clogged with matter, and the drain above the trap blocked. This state of affairs arose solely from want of attention and not from any defect in construction. In speaking of drains, all traps, chambers, &c., are intended to be included. A system of sewerage has lately been constructed in a portion of the district and which will have to be periodically flushed to prevent accumulation. If this is necessary in the case of the sewer, is it not also necessary with respect to the drain? Carelessness and the want of attention are the principal sources of stopped drains. The owners of property are frequently called upon to have work done for the removal of stoppages (of course entailing expense), which might have been obviated by a little attention on the part of the tenant. It must be remembered, too, that a

drain once disturbed is seldom or never made perfect again. Mr. Boulter says his attention has long been directed to the necessity of adopting some means by which, when a drain is once laid, it shall not be necessary to interfere with it again, so far as its position goes; but he finds it is not possible to keep it thoroughly cleansed under existing circumstances. His proposition is that the Sanitary Authority of the district should undertake the work, which is now generally neglected by the occupiers of houses (who are, in the majority of cases, ratepayers), and that the cost of carrying out this work should be a charge upon the rates. He proposes to deal with the question in the following way: A workman in the employ of the Authority would be furnished with certain implements and deodorants (removed from place to place as necessity required, in a perambulator, similar to that in use at Bexley for lighting purposes), and would visit all occupied dwellings and other properties. He would follow a certain line of sewer and would cleanse and deodorise the private drainage along that line. That being done, a flushing van would be employed to discharge into the manholes attached to the sewers such a quantity of water, mixed with the deodorant, as would efficiently cleanse and flush the sewer in question. The work would be carried out in sections, so arranged as to deal with the upper part, continuing down to the outfall of each section. It is his opinion that if this were done there would be fewer complaints with regard to smell from ventilators. The deodorant used would be manganate of soda, which has, for nearly three years, been successfully used in the cleansing of cesspools, upon the Huxley system. The cost of the deodorant for flushing purposes would be but small compared with the work accomplished.

THE MANCHESTER SHIP CANAL AND SEWAGE DISPOSAL.—The approaching completion of the Canal has had the effect of compelling the various local authorities on the Irwell to take steps to purify their sewage before discharging it into the river. The Manchester sewage works (described in the *Builder* for May 13 last) will shortly be completed, and Salford has for some time been experimenting with various processes for effectually treating the sewage of the borough, which amounts to some ten million gallons per day. The disposal of the sludge is, however, in many cases a very troublesome problem, and with a view to solving the difficulty at Salford, Messrs. John Taylor, Sons, & Santo Crimp, of Westminster, have been requested to advise the authorities as to the best methods of disposal.

STAINED GLASS AND DECORATION.

MEMORIAL WINDOWS, CRAILING PARISH CHURCH, ROXBURGH.—Two additional stained glass windows have been placed in Craling Parish Church. They are the gift of Miss Paton, of Craling, in memory of her father and mother, and are placed in the apse on either side of the communion table. The subject of one window is "The True Vine." The subject of the other window is "The Bread of Life." The windows were designed by Mr. M. McGregor Chalmers, architect, Glasgow, who lately had charge of the restoration of the building, and the work was executed by Mr. Norman M'Dougall, of Glasgow.

DECORATION OF ST. ALBAN'S CATHOLIC CHURCH, LIVERPOOL.—After having been closed for decoration and renovation, St. Alban's Church, Athol-street, Liverpool, was re-opened on the 25th ult. The work of decoration was carried out by Messrs. Jelley & Co., of Liverpool. The walls are coloured light green, with a stone-coloured buff for the soffits of the arches. The circling of the sanctuary has been treated as a glimpse of the blue sky studded with stars. The walls of the sanctuary are draped with Gothic designs. A string of medallions in blue and gold alternately runs round the walls of the church, those over the sanctuary being of the four Evangelists, and the rest representing the Chalice, the Sacred Heart, different instruments of the Passion, &c.

FOREIGN AND COLONIAL.

FRANCE.—The town of Rouen is organising an Exhibition of Fine Arts, to be open from September 30 to November 30. This exhibition will be held in the Musée Bibliothèque. Architecture, painting, sculpture, engraving, all will be admitted. In a few days the monument erected by subscription to the memory of Doctor Ricord will be placed in front of the Hôpital du Midi, Paris. The statue is by M. Ernest Barrias. A marble bas-relief by M. Lombard has been placed in the large hall of the Paris Conservatoire de Musique; it represents Saint Cecilia playing the organ, surrounded by seraphim. It was bought by the State from the Salon of 1889.—M. Mercier has just finished the monument of Joan of Arc, which is to be erected on the Place at Domremy. The monument consists of two figures, the genius of France as a knight in armour, with raised visor. With one hand he gives Joan a

sword, with the other he points out the enemy to her. She is dressed in a peasant costume, with bare head. She has thrown her distaff by the side of a lamb, whose front feet are planted on her dress.—A Museum of Fine Arts is to be built at Nantes-sur-Marne, at a cost of 1,233,000 francs.—The Society of Fine Arts at Boulogne has organised an art exhibition, which will be open from August 1st to September 1st.—The Ministère de la Marine is going to undertake an important work, the lowering of the bed of the Charente between the port of Rochefort and the roadstead of the Ile d'Aix. The work will take four years, and will cost three millions.—The engineers of public ways in Paris are going to put to the test a system of metallic paving, invented by an inhabitant of Geneva, and which is specially adapted for tram-roads. The experiment will be made on a part of the Boulevard Sebastopol, and in the Rue St. Antoine in front of the Protestant church.—The official journal of the French Republic has just promulgated a law relating to the hygiene and safety of workers in industrial institutions.—MM. Falguère and Mercier have just finished the model of the monument to Alfred de Musset, erected at the expense of M. Osiris. This monument, destined first for the Place St. Augustine, will now be erected on the raised platform planted with trees opposite the Théâtre Français.

NORWAY.—The Polytechnic Society of Christiania, the second leading architectural and engineering society of Norway, has just celebrated the fortieth anniversary of its existence.—At the general meeting of the Norwegian Engineers and Architects' Society, Herr Rasmussen, engineer, was elected President for the year, and Herr B. Lange, architect, vice-president. There are, besides, six districts in the Council. The Society now numbers 180 members, and the Polytechnic Society, with which it is affiliated, 425 members, the increase since 1891 being respectively 11 per cent. and 5½ per cent.—The death is announced from Meran of a highly-promising young architect, Herr Karl Henriksen, at the early age of twenty-five. In 1890 the deceased took first prize in the competition for the Historical Museum in Christiania, amongst seventeen competitors, and in 1891 prepared the working drawings for the building.—The Norwegian Government has again introduced the Bills for the Storting for the erection of new Government offices in Christiania, strongly recommending the immediate commencement of the same. The plans prepared by the well-known architect, Herr Lenschow, are to be adopted.—The Storting has granted a further sum of 100,000 kr. in the current financial year for the continuation of the new Customs houses in Christiania.—The electric light has been introduced everywhere in the Storting building, and a complete revolution has been effected in the ventilation of the house, formerly very defective.—A new public building has been erected in Christiania, being the home of the Norwegian Medical Society. The building is spoken of as a model one, from a hygienic and sanitary point of view. The architect is Herr Nissen.—At the Cathedral of Trondhjem the first steps are being taken for the restoration of the western nave. When this work is completed the rebuilding of the great tower will be begun. The Government has declined to grant an extra 100,000 kr. towards the work.

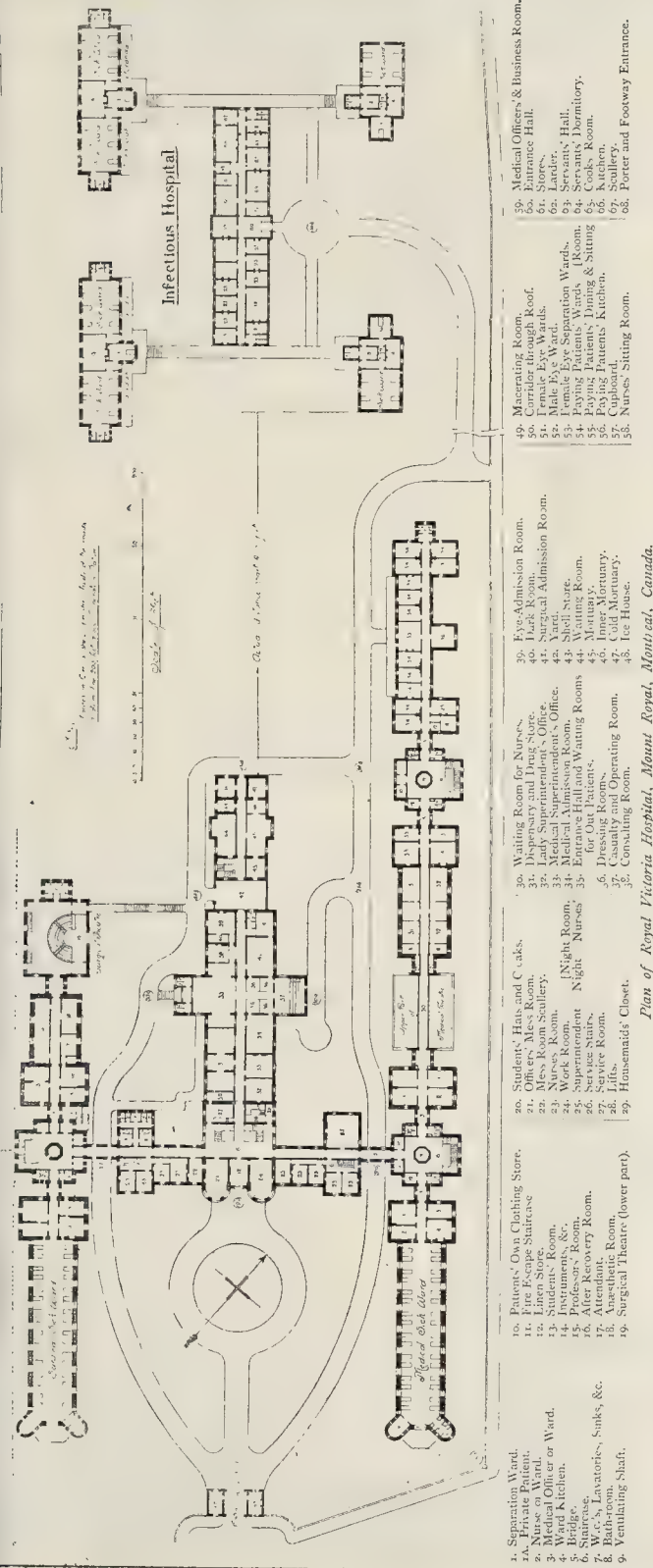
SWEDEN AND DENMARK.—Negotiations are in progress between various public bodies for the holding of an industrial and art exhibition in Stockholm in 1896.—The new waterworks at Gothenburg are now completed. They are situated on the river Göta, about three miles from the town. The great pump-house forms a large open hall, in which are worked two high-pressure pumps on Professor Riedel's system. They are worked by two steam-engines of 400 h.p. each, delivering 50 litres of water per second. Another set of pumps and engines are to be added. The whole establishment is lighted by electricity. The intake, of Portland cement, extends 50 metres into the river. The filters, covered with a dome of Portland cement, have a diameter of from 30 to 40 metres, and rest upon pillars. The entrance to the same is through a handsome portal, designed by Herr Ad. Petersen, architect. The plans for the entire works have been prepared by Herr G. Richert, civil engineer. There is also a dwelling-house for the staff. The entire establishment is to be surrounded by gardens.—One of the largest breweries in Scandinavia has just been completed in Stockholm. It occupies an area of 90,000 sq. ft., and consists of three huge buildings. The erection commenced April, 1892, the architect being Herr Alvin Jacobi.—A new cement factory is being established in the district of Malmø. It has been introduced into the Danish Rigsdag for the erection in Copenhagen of new barracks for the Corps of Engineers and the Hussars of the Guards. The cost of the former is estimated at 1,000,000 kr., and the establishment is to be completed in two years. The cost of the latter is not yet determined.—The Association for the Improvement of Copenhagen has just held its annual meeting, when it was announced that the society numbers 415 members and that much useful work had been done last year.—The celebrated Norwegian sculptor, Stephan Sinding, has been commissioned to execute the font for the great Marble Church in Copenhagen, upon which work has been in intermittent progress for

two centuries. The font will be cast of aluminium-bronze, and will be flanked by a huge angel cast from the same metal. Fair progress is now being made with the edifice.—The English engineer, Mr. M. Carey, has prepared plans for the construction of a harbour in the Ringkjøbing Fjord, with a direct sea-canal to the town of that name. He proposes to cut through the "Vib Sand" cliffs, making a canal 28 ft. in depth without locks, and to construct a harbour with two breakwaters and quays 1,160 ft. long, and from 300 ft. to 600 ft. apart. The cost is estimated at 5,400,000 kr. (300,000*l.*) The town council of Ringkjøbing is supporting the scheme, and it is projected to form a company for its carrying.

THE PROJECTED DANUBE-ODER CANAL.—The Austrian Imperial Council has now under immediate consideration the plans for the construction of the Danube-Oder Canal, and also those for the establishment of water communication between the Danube and the Elbe. The cost of the undertaking is estimated at 20,000,000 florins, of which sum the Government are most interested, viz. Bohemia, Moravia, and Lower Austria, offer to contribute 15,000,000 florins, and it is therefore hoped that the State will contribute the remaining 4,000,000 florins. The necessity for the canal is great, as at present the Northern Railway is hardly capable of carrying the coals required for the improvement of the Danube at the Iron Gate and the narrow passages at Gönyö will have been effected, and canals between the Elbe and the Oder on one side and the Danube on the other would open up a Continental water-way between the Black Sea, the Baltic, and the North Sea. The Council has also adopted a resolution recommending the construction of a large network of railways for the connexion of all the various railway systems of the Empire. The cost of this undertaking would be so great that a loan would be necessary.

ROYAL VICTORIA HOSPITAL, MONTREAL.—This new building, beautifully situated on the steep eastern slopes of Mount Royal, overlooks the city and the broad expanse of St. Lawrence River, while the mountain rising ever more steeply in the rear forms a noble background. The institution owes its origin to the munificence of two distinguished Canadians, Lord Mount-Stephen and Sir Donald Smith, K.C.M.G., LL.D. Camb., who provided the whole of the money, one million dollars, thought necessary for the erection and endowment of the hospital. The part now erected comprises the medical, surgical, administrative, and nursing departments. A site for the institution was originally given by the Corporation of Montreal, but in consequence of objections made by the inhabitants as to the hospital buildings being erected upon it, the adjoining plot of ground was purchased. The buildings have been designed and the working drawings prepared by Mr. H. Saxon Snell, F.R.I.B.A., London, after consultation with and receiving the final approval of many of the most eminent authorities in Montreal, including Drs. R. Craik, W. Gardiner, T. G. Roddick, C. Ross, and T. Shepherd. The erection of the building has been superintended by Mr. J. R. Rhind. The narrowness of the site gave rise to much difficulty in designing the buildings, but a far greater problem had to be solved in consequence of the uneven nature and steepness of the ground, which rises no less than 180 ft. in its length and from 30 ft. to 80 ft. in its breadth. The architect has combated this difficulty by making the main entrance for patients midway up the slope on which the main building stands, and thus permitting one floor of the various blocks to be reached on the same level. The main entrance, when completed, will comprise thirteen distinct blocks, connected by bridges. The ward blocks are ranged along the north-east and south-west boundaries. Between these is the administrative block, in which are also the out-patients' departments and receiving rooms. The two large projecting blocks on the south-west and north-east boundaries each contain three large wards for the accommodation of thirty-two patients in each. The north-east block is devoted to medical and the south-west block to surgical patients. Attached to each large ward are the nurses' and medical officers' rooms, the ward kitchen, and a separation ward for two beds. The bath-rooms and ward-offices are contained in the round towers at the ends of the wards, which are so placed as not to interfere appreciably with the outlook from the large end windows and the balconies provided for the use of the patients. Adjoining each ward block, and connected with them by cross-ventilated bridges (which in summer-time would be quite open), is the staircase block, containing a broad and easy-going staircase, patient's closets, patient's clothing and linen stores, &c. In the centre is the large ventilating shaft which draws the foul air from all the adjoining wards. Up the centre of this shaft is carried the smoke shaft from the boilers in the basement, which materially assists in drawing a broad and easy-going staircase, patient's closets, patient's clothing and linen stores, &c. In the centre is the large ventilating shaft which draws the foul air from all the adjoining wards. Up the centre of this shaft is carried the smoke shaft from the boilers in the basement, which materially assists in drawing a broad and easy-going staircase, patient's closets, patient's clothing and linen stores, &c. In the centre is the large ventilating shaft which draws the foul air from all the adjoining wards. Up the centre of this shaft is carried the smoke shaft from the boilers in the basement, which materially assists in drawing a broad and easy-going staircase, patient's closets, patient's clothing and linen stores, &c. 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Infectious Hospital



described block. Here also are an anæsthetic and an after-recovery room, with attendants' room between them. The medical theatre seats 200 students; the adjoining professor's private room, clinical chemistry room, and patients' waiting-room being on the ground floor of the staircase block. In the rear of the back extension of the administrative buildings is a detached pathological block containing on the ground-floor the mortuary, mourners' waiting-room, staircase, and shell-store; and also an ice-house, macerating-room, cold mortuary, and lift in direct communication with the pathological theatre above. In the rear of the main hospital blocks, and at a considerable distance from them, is the site of the infectious hospital on the hut system. It is proposed that this shall consist of five distinct buildings, unconnected except by path and roadways. There will be two blocks, each containing two wards for six beds each, and two smaller buildings, each containing one ward for four beds, and one isolation ward for one bed. Each block is to have its own ward-kitchen, bath-room, &c.

MISCELLANEOUS.

INSTITUTION OF CIVIL ENGINEERS.—At the first meeting of the recently-elected Council of the Institution of Civil Engineers the following re-appointments were made:—Mr. Hugh Lindsay Antroub as Treasurer, Dr. William Fole, F.R.S., as Honorary Secretary, and Mr. James Forrest as the Secretary. The Council consists of Mr. A. Giles, President; Sir Robert Rawlinson, K.C.B., Sir B. Baker, K.C.M.G., LL.D., F.R.S., Sir Jas. N. Douglass, F.R.S., and Mr. J. Wolfe Barry, Vice-Presidents; Dr. William Anderson, F.R.S., Mr. Alex. R. Binnie, Sir Douglas Fox, Sir Charles Hartley, K.C.M.G., F.R.S.E., Mr. J. C. Hawke, Mr. Charles Hawkesley, Professor Alex. B. W. Kennedy, F.R.S., Sir Bradford Leslie, K.C.I.E., Mr. Jas. Mansergh, Sir Guildford L. Molesworth, K.C.I.E., Mr. W. H. Preece, F.R.S., Sir Edward James Reed, K.C.B., F.R.S., M.P., Mr. William Shelford, Mr. F. W. Webb, and Mr. W. H. White, C.B. F.R.S.

IRONWORK COATED WITH ALUMINIUM.—The ironwork of the City Building, Philadelphia, will, says the *Scientific American*, be coated with aluminium. The late Mr. McArthur, the architect of the building, wished from the first to cover the ironwork with a skin of aluminium to protect it from the weather and save the cost of painting, which, it was estimated, would, if the iron were to be kept secure against rust, amount to 10,000 dols. per annum.—*Invention.*

ADAMS'S DOVETAIL-KEYED BRICK.—This is a glazed brick with the frog formed of a dovetail section, as shown in the cut, so that the mortar or cement will key the bricks together. Furthermore, in all except the bricks intended for headers, the sinking is carried right through to the end of the brick, instead of being left as a closed panel, so that compressed air can escape at the ends and give the best chance for the frog to be entirely and compactly filled with mortar. The patentee is Mr. S. Adams, of Southend, and the right of production has been conditionally granted to Messrs. J. Cliff & Sons.

ROYAL STATISTICAL SOCIETY.—At the meeting of the Royal Statistical Society, held on the 20th ult. at the Museum of Practical Geology, Jermyn-street, a paper was read by Dr. G. B. Longstaff, on "Rural Depopulation." The main object of the author was to give a broad view of the facts, to show in what countries rural depopulation existed, and its degree. The case of the United Kingdom was examined in considerable detail. It was shown that the phenomenon appeared in 1851 in Wales, and, speaking generally, ten years later in England; that during the last decade nine out of the twelve Welsh counties had decreased in numbers. An elaborate analysis of the registration districts proved that, taking England and Wales as a whole, the loss of rural population was the same in the decade just completed as in 1871-81. But the decrease was not so great as was commonly supposed; thus during the last twenty years there were but eight English and three Welsh counties which had lost 10 per cent. of their rural population, even in the districts especially selected by the author as showing depopulation in its most intense form. The changes during forty years in a group of registration districts in the eastern counties were compared with those in a group in the south-west, where the depopulation began ten years earlier; in a few of these districts the loss of inhabitants ranged from 20 to 30 per cent. The author claimed to have proved that not only was the disproportionate growth of large towns a phenomenon of universal prevalence, but that an actual diminution of the rural population occurred in the greater part of Europe, in North America, and even in Australia. He stated that such a general result could not be, in the main at all events, due to causes of only local occurrence, such as special forms of government, of land laws,

JUNE 16.—II,865, J. and A. Gray, Siphon Cistern-fc

LONDON.—For painting and decorating chapel and for repairs to houses, of the Licensed Victuallers' Asylum, Old Kent-road, S.E. Mr. W. P. Potter, architect. Quantities prepared by Mr. C. R. Griffiths, surveyor, Bank Chambers, Toley-street, London Bridge, S.E. —

	Painting, &c., to Chapel.	General Repairs.
Young & Lonsdale.....	£567 0 0	—
W. J. Walker.....	214 0 0	£573 0 0
Pritchard & Renwick.....	197 0 0	239 0 0
S. Hayworth & Sons.....	278 15 0	239 0 0

* Accepted.

LONDON.—For additions and alterations to 573, Caledonian-road, N., for Mr. William Drake. Mr. John Honor, surveyor, 12, Thornhill-square, N.

Williams & Son.....	£450 0 0	Starkie.....	£378 10 0
Charles Cook.....	448 10 0	Ruffell (accepted) ..	360 0 0

LONDON.—For alteration to 10, Westbourne Grove for Mr. R. Beardall. Messrs. Treadwell & Martin, architects, 2, Waterloo Place, Pall Mall.

T. Sage & Co.....	£1,200	Drew & Cadman.....	£694
Sparks & Son.....	1,074	Scharrin & Co. (accepted) 993	
C. F. Kearney.....	1,048		

LONDON.—For outside painting at the "Brewery," Vauxhall, S.E., for the New London Brewery Company, Limited. Mr. William J. Ingram, architect, 44, Theobalds-road, Bedford-row, W.C.

Sabey & Son.....	£335 0 0	E. R. Palmer.....	£160 0 0
W. Rowe.....	302 0 0	Hayworth & Sons.....	118 0 0
White & Co.....	221 0 0	J. Puttick.....	255 0 0
J. Sparks.....	300 0 0	J. Parsons.....	143 10 0
B. E. Nightingale.....	191 0 0	O. Richardson.....	145 0 0
Mid Kent Building Co.,	198 0 0	J. Knight, Westminster*	135 17
J. Howlett.....	273 0 0		

* Accepted.

LONDON.—For alterations and additions to "The Eclipse" beer-house, for the New London Brewery Company, Limited. Mr. William J. Ingram, architect, 44, Theobalds-road, Bedford-row, W.C.

W. Rowe.....	£575	J. Howlett.....	£440
B. E. Nightingale.....	283	J. Puttick.....	423
J. Sparks.....	475	J. Knight.....	417
White & Co.....	475	Mid Kent Building Co.*.....	399
J. O. Richardson.....	468		

* Accepted.

MARKET HARBOROUGH.—For the construction of pipe sewers, for the Rural Sanitary Authority. Mr. Buggs, Surveyor, 45, Nelson-street, Market Harborough.

C. Duffield.....	£2,850 0 0	I. Young & Son.....	£1,590 0 0
F. Butler.....	1,000 0 0	F. Haycock.....	1,450 16 0
H. Hewitt.....	1,735 0 0	H. W. Wilson.....	1,426 6 5
J. Jameson.....	1,717 0 0	J. Holme.....	1,357 0 0
J. Neave.....	1,600 0 0	S. Smith, Little	
J. Mason.....	1,564 11 0	Bowden, Market	
S. & J. Bentley.....	1,540 0 0	Harborough*.....	1,706 15 0
Hall.....	1,573 0 0	A. Jewell.....	1,300 0 0

* Accepted.

PONTYPRIDD.—For the erection of school buildings, Aber-bechan, for the Llanwern School Board. Mr. A. O. Evans, architect, Market-chambers, Pontypridd.

J. Howells.....	£266 0 0	C. Jenkins & Son.....	£750 0 0
Williams & James.....	824 4 4		

PRESCOT (Lancs.).—Accepted for the enlargement of the vagrant works at the workhouse, Whiston, for the Union Guardians. Mr. J. Gandy, architect, Masonic Buildings, Hall-street, St. Helen's. Quantities by architect.

John Lucas, Prescott, Lancs.....	£609 0 0		
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READING.—For reconstructing the interior, &c., of the Manor Farm House, for the Corporation of Reading. Mr. Arthur E. Collins, Borough Engineer and Surveyor.

Porbitt & Son.....	£297	C. H. Tucker.....	£662
G. Searle.....	720	W. Hawkins*.....	637

[All of Reading.]

* Recommended for acceptance.

READING.—For improving and repairing the drainage of the school buildings, and residences attached, at the Reading School, for the trustees under the superintendence of Mr. Arthur E. Collins, Borough Engineer and Surveyor.

Boyd & Motley.....	£151 0 0	Collier & Catley*.....	£148 2
G. H. Tucker.....	148 3		

[All of Reading.]

* Accepted.

REDMARSHALL.—For the repairs and re-roofing of St. Cuthbert's Church, Redmarshall, for the Rector and Churchwardens. Mr. Charles C. Hodges, architect, Heston.

E. Cuddas & Son.....	£541 10 11	Craggs & Benson.....	£503 0 0
Geo. Graden & Son.....	592 11 0	John Davison*.....	450 0 0

[All of Reading.]

* Accepted.

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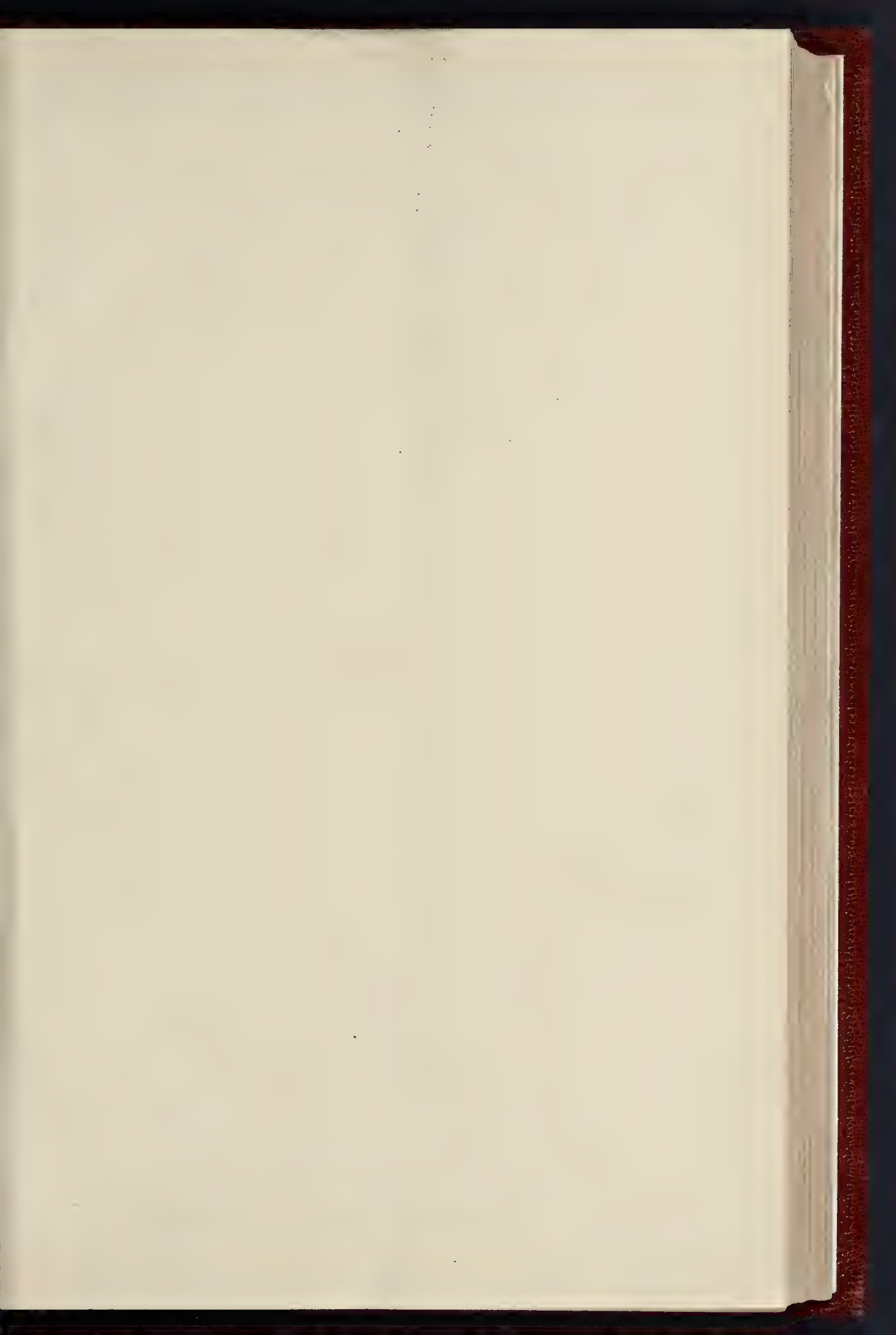
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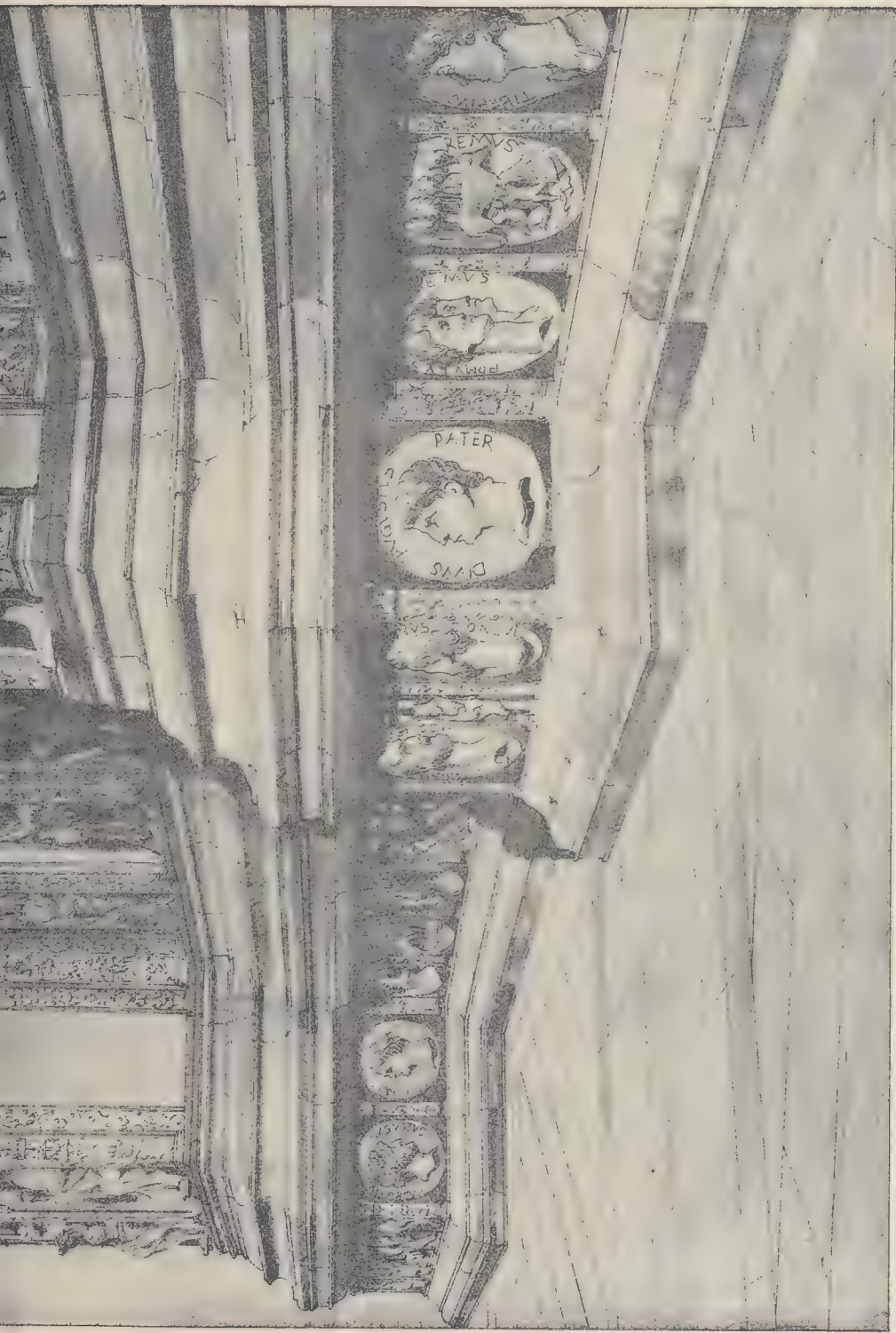
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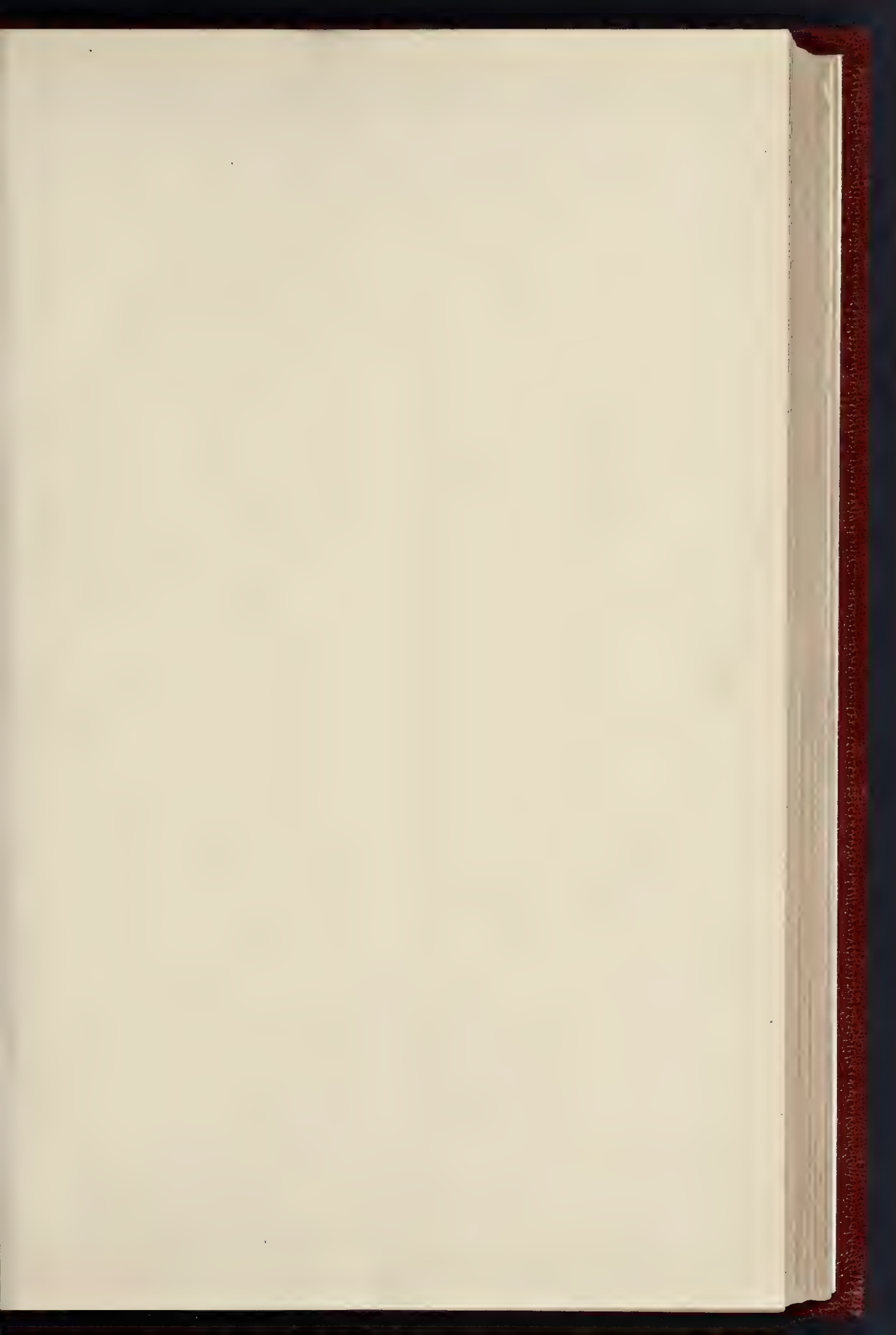


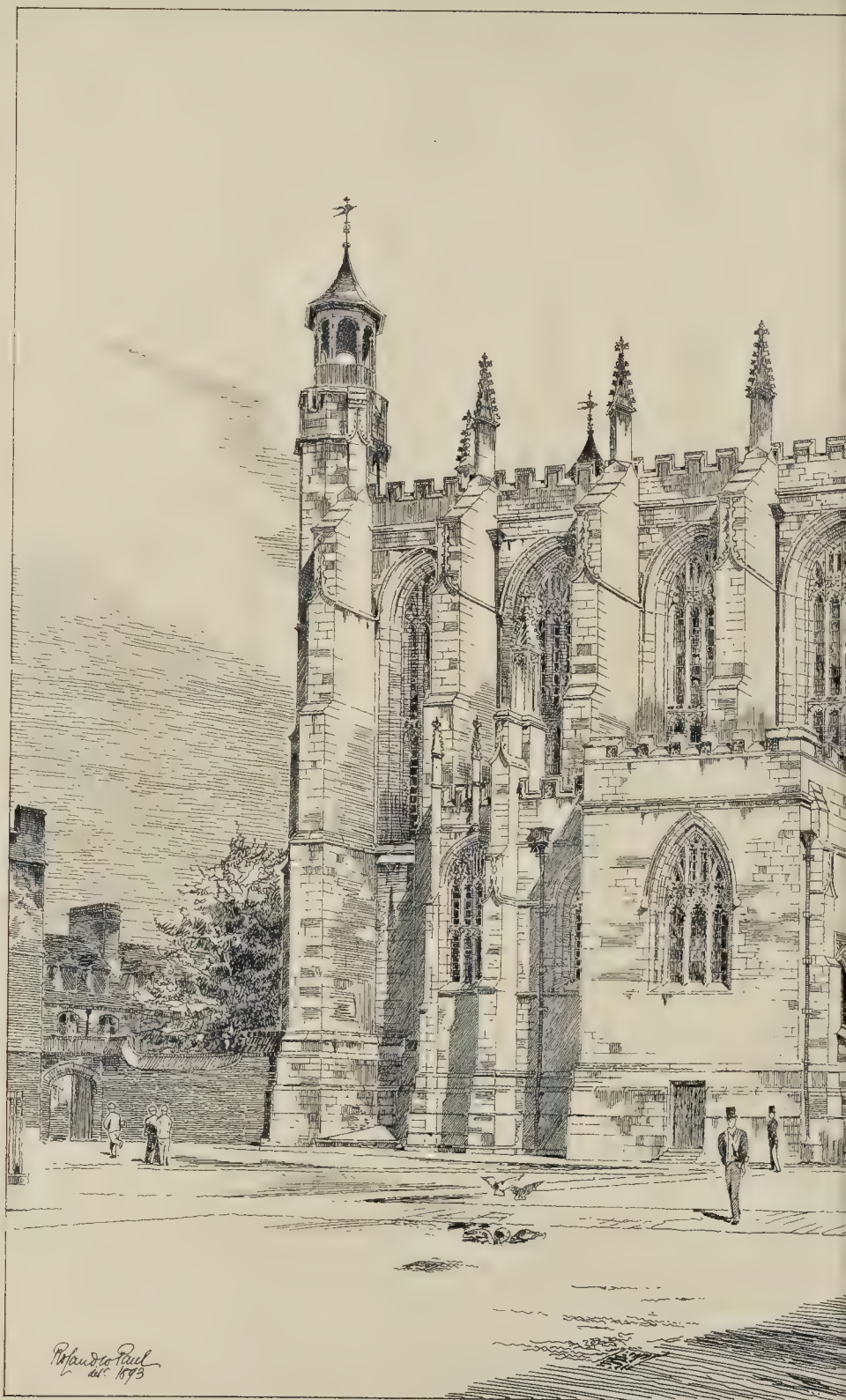
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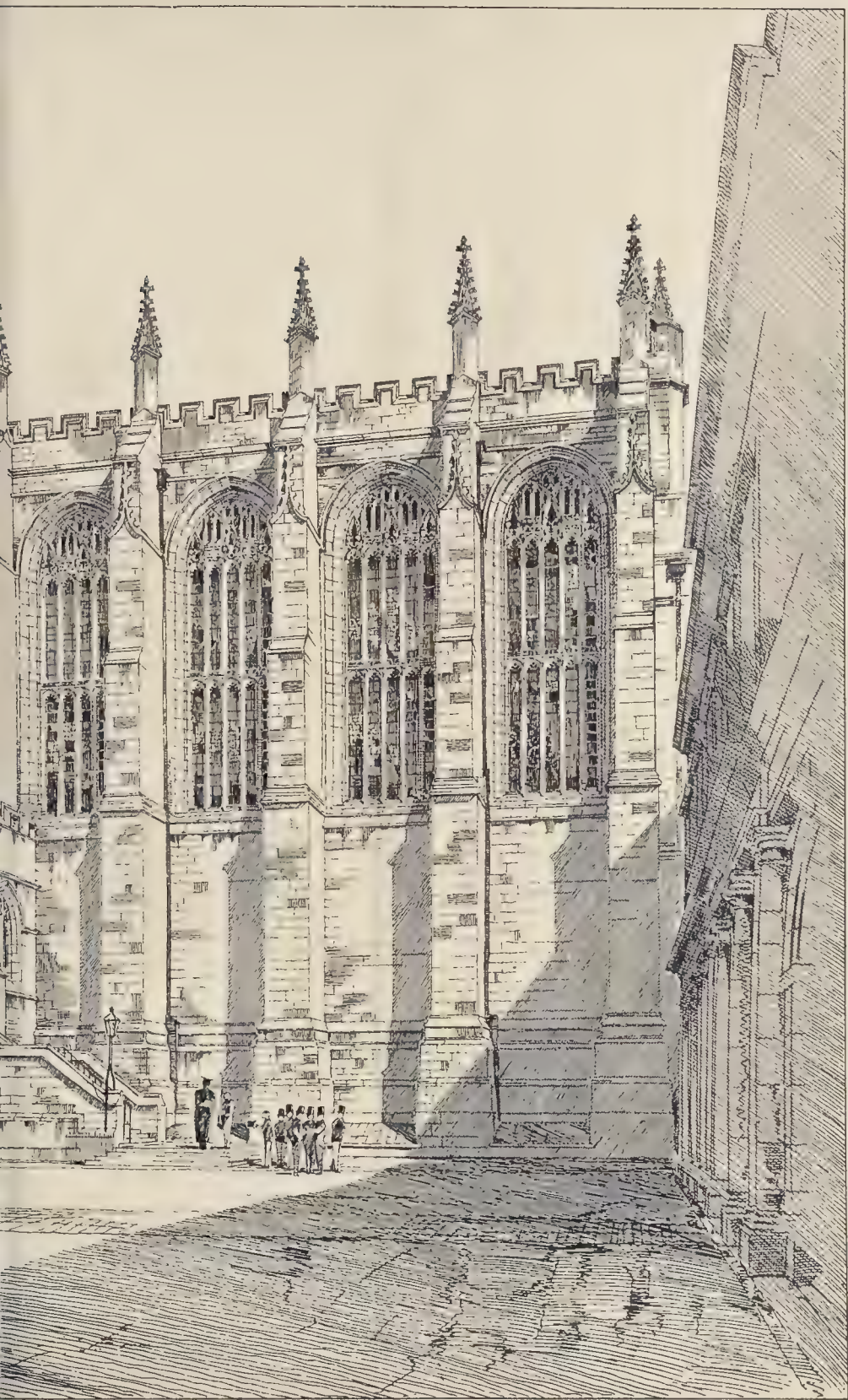


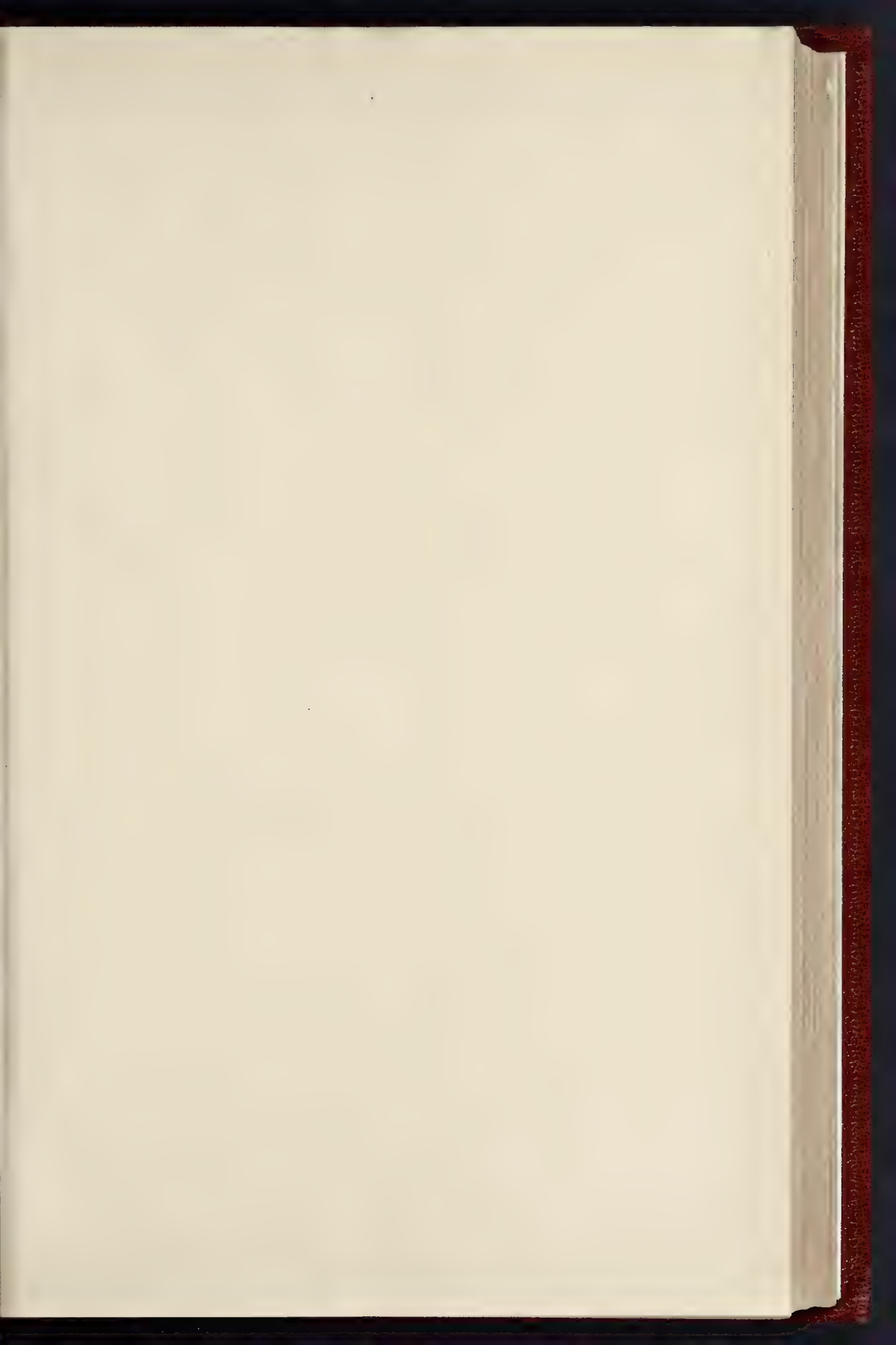


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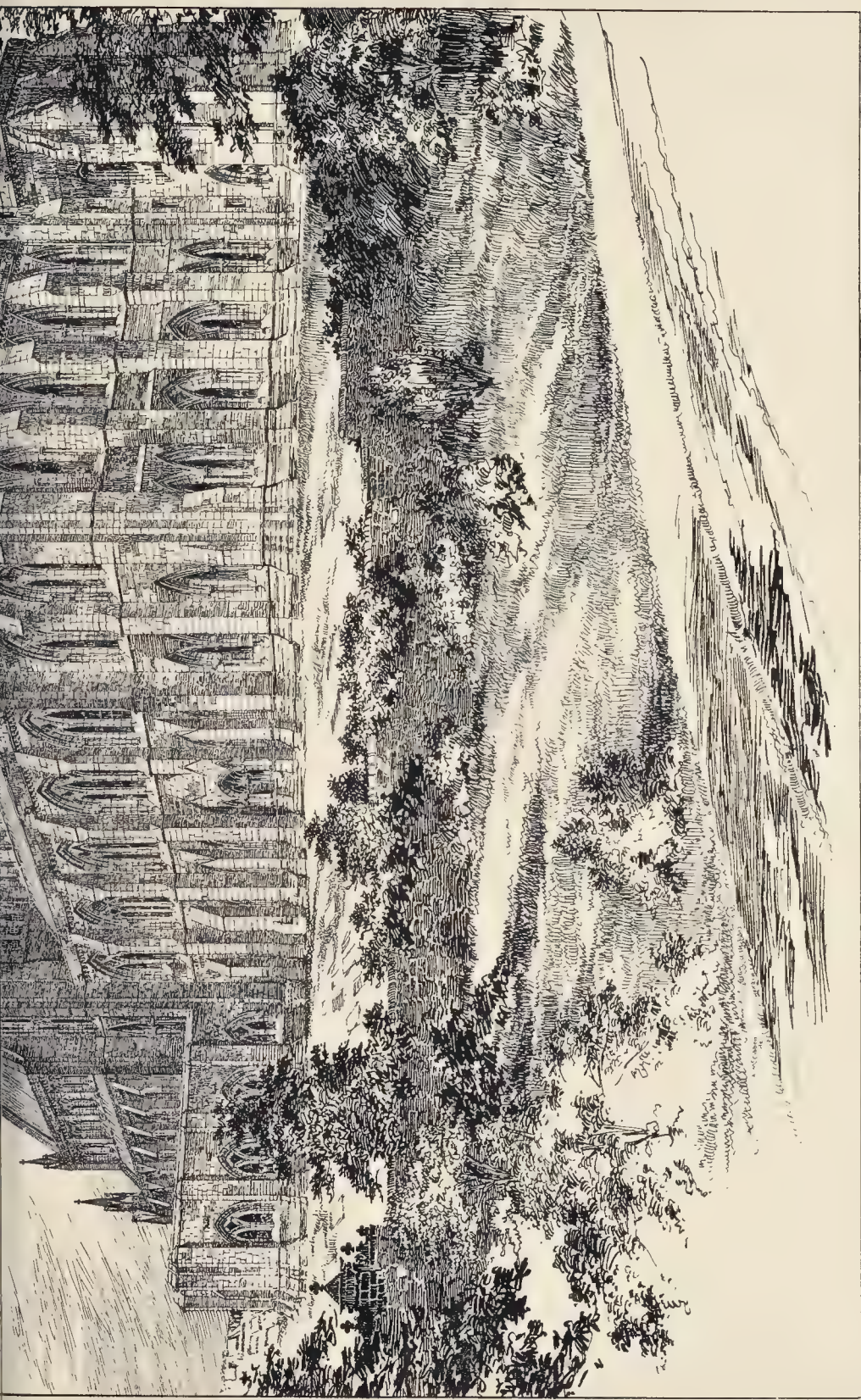






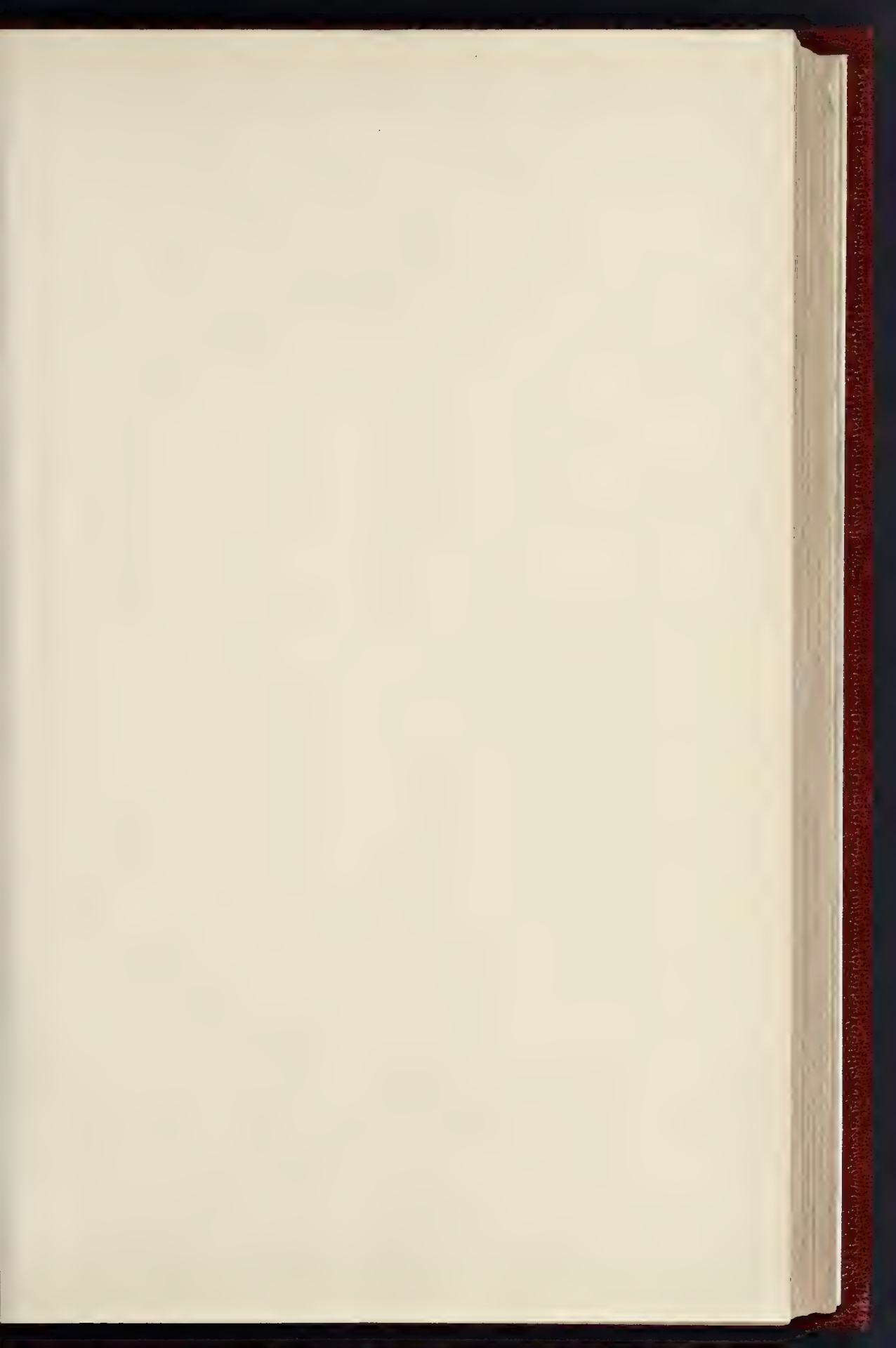
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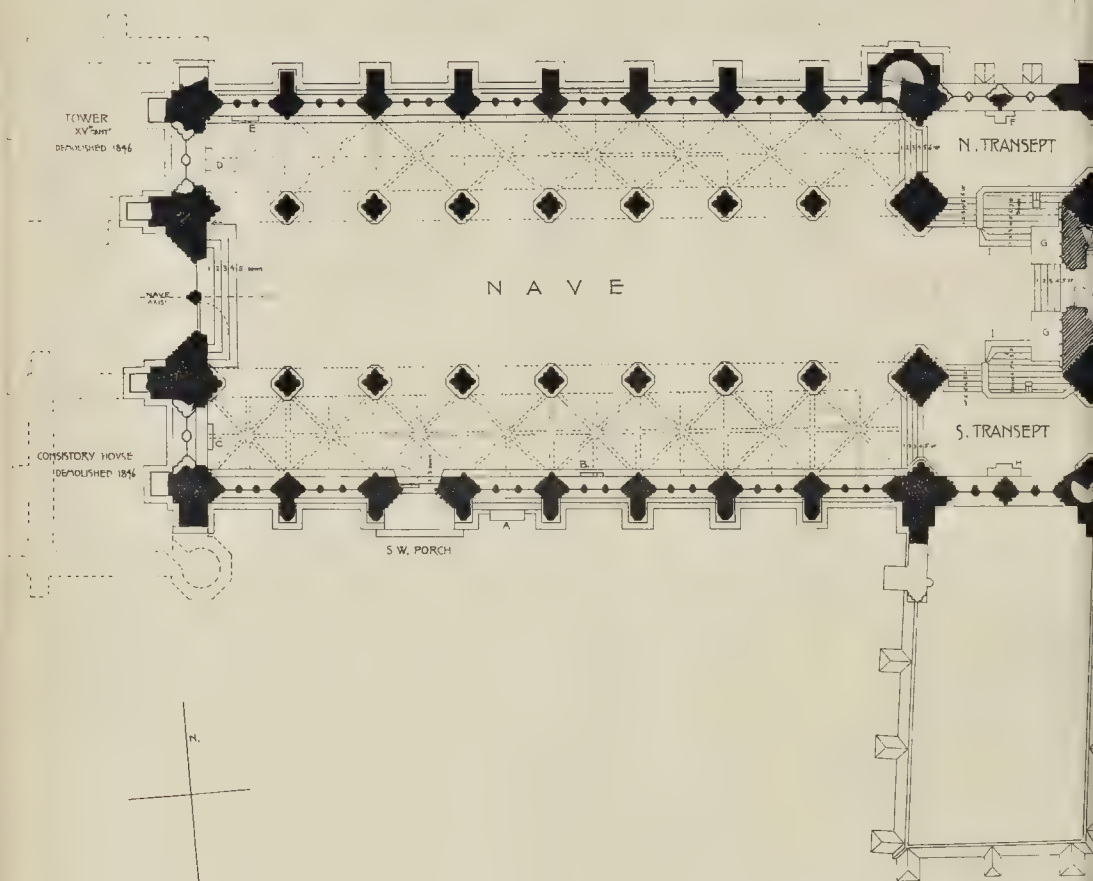








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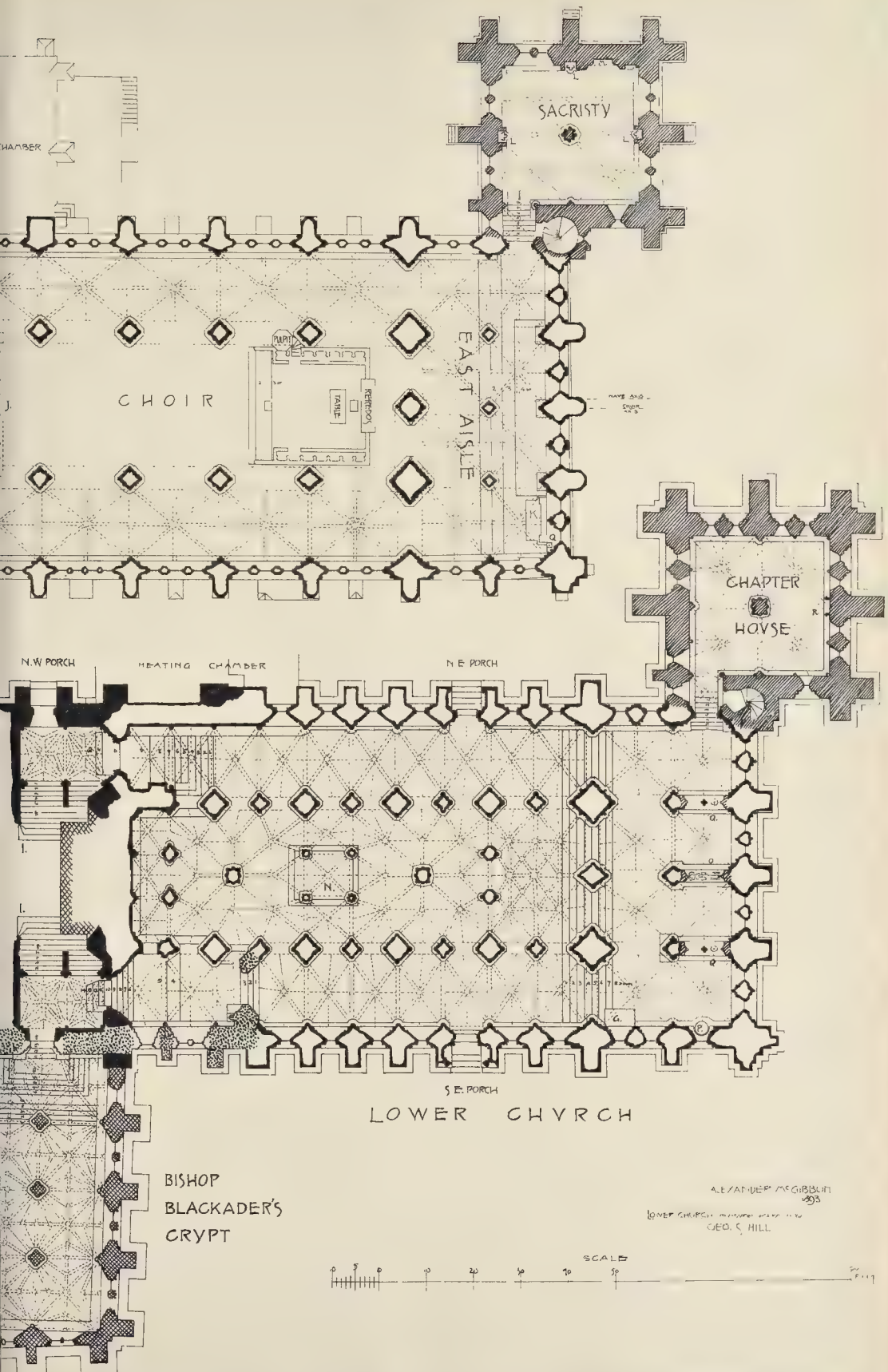


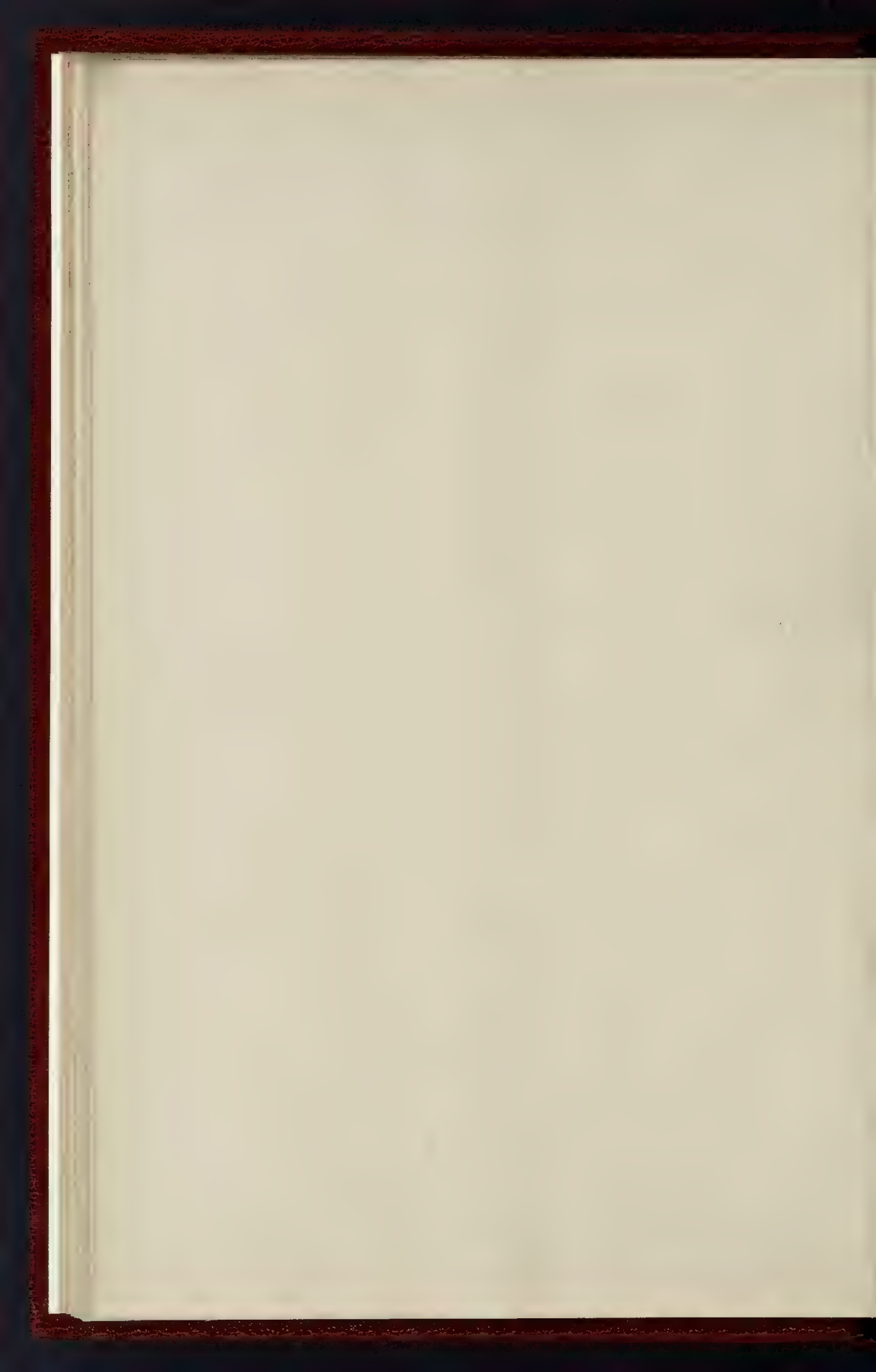
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	TRANSITIONAL
	1235 - 1260
	1260 - 1350
	1425 - 53
	1484 - 1505
	REBUILT 1846

A	MONT THOS. HUTCHESON	1641
B	" KNIGHTS OF MINTO	1605
C	" AND ^o COCHRANE	1777
D	" LT JOHN STIRLING	1829
E	" HON. HENRY CADOGAN	1841
F	" DR CRYSTAL	1890
G	ALTAR	
H	MONT ST JAMES WATSON	1890
I	DESCENT & LOWER CHURCH	
J	CHOIR GALLERY	
K	MONT ARCHB ^o LAW	632
L	WARDROBE	
M	FIREPLACE	
N	ST MUNGO'S TOMB	
O	B ^o WISHART'S	
P	ST MUNGO'S WELL	
Q	PISCINA	
R	DEAN'S SEAT	





The Builder.

Vol. LXXV. No. 2637.

JULY 8, 1893.

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Battersea Town-hall.—Mr. E. W. Mountford, F.R.I.B.A., Architect.....	Double-Page Ink-Photo.
Leeds School of Medicine, Mount Pleasant, Leeds.—Mr. W. H. Thorp, F.R.I.B.A., Architect.....	Double-Page Photo-Litho.
Pair of Houses at Burnt Ash Hill, Lee.—Mr. R. A. Briggs, F.R.I.B.A., Architect.....	Single-Page Photo-Litho.
House at Maidenhead.—Mr. R. A. Briggs, F.R.I.B.A., Architect.....	Single-Page Photo-Litho.
Sculpture, New Gallery Exhibition: "A Scytheman."—Mr. E. Roscoe Mullins, Sculptor.....	Single-Page Ink-Photo.
Sculpture, Royal Academy Exhibition: "Girl Binding her Hair."—Mr. W. Goscombe John, Sculptor.....	Single-Page Ink-Photo.

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London Street Improvements.



THAT street improvements in such an immense and continually increasing city (or district) as London ought to be carried out in conformity with a comprehensive

preconceived scheme, seems little more than ordinary common sense. In most of the great cities of the world this has been done more or less; in all of them the necessity of having a general scheme, and making every fresh improvement subservient to it, would probably be fully admitted, in theory at all events. But there seems to be in the English mind, and more especially in the London mind, a kind of inherent indifference to the systematic carrying out of city improvements. Year after year, and decade after decade, we go on, in an aimless kind of way, widening a street in one place, cutting a new one through in another, without regard to any consideration as to how these operations may clash with or assist future possible improvements of the same kind. Everything of the kind is conceived and carried out piecemeal.

This is such an utter and melancholy mistake, that it is to be hoped that some public attention may be attracted to a book* which at least has the merit of insisting strongly on the need of improvement in London, and on the immense advantage—almost necessity—of adopting a broad scheme of improvement and carrying out all the details in subordination to it. With some of Mr. Cawston's suggestions, indeed, we are very much at variance; but the general principle of his book is right.

On another page of this issue we have occasion to refer to a sarcastic article by Mr. Grant Allen in one of the July magazines, on "Beautiful London"; an article which we suggest is rather obtrusively pessimist. There are undeniable beauties in London, as more than one talented artist of the day has frequently reminded us. But they are not mostly beauties of the sumptuous or stately

order. Our great buildings that are really impressive as architectural monuments are only three: the Abbey, St. Paul's, and the Houses of Parliament. Even the Abbey is greatly discounted for exterior value by the extent to which it has been restored and modernised (we do not refer to the recent north transept, but to work of earlier and well-meaning restorers); still the interior remains little spoiled, and is better in that way than anything Paris has to show. At South Kensington there is a neighbourhood of palaces springing up, but one can hardly regard them as of equal interest with the three already named, which are our only great buildings in London. The Law Courts, regarded in this light, as a monumental London building, is worse than nowhere; from the first it completely lacked dignity, and grows annually more and more sad and dingy-looking. Just compare this grim-looking prison of a building with such a piece of stately architecture as Duc's Palais de Justice. Compare the National Gallery with the Louvre: the Covent Garden Theatre, facing sideways on a second-rate street, with the Paris Opera House facing down the broad Avenue de l'Opéra; compare the Marble Arch with the Arc de l'Etoile! In making such comparisons one is almost forced to admit the truth of what we read recently in a daily paper—that London is not a "city" at all in the true sense, but a conglomeration of villages. There are points, however, in favour of London scenery which must not be overlooked. The streets, from the independent way in which fronts are built, are far more picturesque than is generally admitted; they have a varied style and skyline which gives them interest and makes them subjects of pictures. Then London is full of quaint out-of-the-way courtyards and corners in which the trees harmonise admirably with the quiet brick building of the last century. Nothing can be more charming in their way than some of these old-world corners about the Inns of Court and in the churchyards of City churches, and it is noteworthy how trees are kept up and contrive to flourish somehow even in the most apparently unfavourable situations. The other successful parts of London are the Thames embankment and the new residential brick houses of the west and south-west districts. Against these good points are to be set the narrow-

ness of the streets and sidewalks even in the best neighbourhoods, and the mean character of the approaches from the principal railway stations. This last objectionable feature is not peculiar to London among the great capitals. But the narrowness of the streets and comparatively small size and unimposing aspect of the houses which line them are points very much against us by comparison with Paris. There the general acceptance of the "flat" system of houses has led to the erection of a class of tall and substantial-looking stone buildings everywhere, which, together with the ample width of streets and side-walks, give a palatial air to the principal streets compared with which London has the appearance of a second-class city.

Mr. Cawston commences his work with the statement of various other reasons why improvement is loudly called for in London. The first of these is health. No one, he says, can believe that the London death-rate of 20.3, or the Paris one of 21.6, indicate the ultimate goal of sanitary reform. In indulging the idea of reducing these figures by one half, he points to the Hampstead death-rate of 14.7 and the Artizans' Dwellings Company's of 12.85, and contemplates the time when "our dense and thickly-populated slums can be transformed into broad arteries and lofty blocks of dwellings," concerning which we may merely remark here that the breadth of the arteries must strictly keep proportion with the height of the buildings, a point often practically overlooked. We see at present far too great a tendency to build high blocks of dwellings without sufficiently increasing the width of the streets, which is only over-crowding in another direction. The author, indeed, specially refers to this on another page of his book. The second reason Mr. Cawston urges is congested traffic, and more especially the necessity of providing ample width for tramways, if these are to be introduced side by side with ordinary traffic. A third reason, which we regard with a little suspicion, is that of providing work for the labouring classes. This is a very doubtful argument, in an economic sense, to urge in favour of large undertakings. It is putting the cart before the horse. Mr. Cawston indeed gives a side-blow at the theory of "providing special devices for the employment of the unemployed;" but we are on that track as soon as ever we begin to recommend the

* A Comprehensive Scheme for Street Improvements in London. By Arthur Cawston, A.R.I.B.A. London: Edward Stanford; 1893.

employment of the unemployed as a reason in itself in favour of an undertaking. Under the head of "general benefits" are enumerated the relief of the monotony of the squalid districts of London by breaking through them with large and wide streets and a better class of property; and here we agree with the author entirely. The example which he cites of Shaftesbury Avenue and the Seven Dials neighbourhood is quite to the point. New life and light, physically and morally, are brought into such neighbourhoods by piercing them with wide new streets, and the sooner this can be carried out in further directions the better. This is matter of common talk and common consent; and one kind of benefit to the community cited by the author is not so commonly recognised: viz., the increase of accommodation for the best class of shops. Mr. Cawston urges that the enormous shop rents and consequently high prices in the best quarters of London are largely due to the deficiency of good streets in which such shops can find any desirable and suitable footing. He adduces the example of what followed the making of Queen Victoria-street. Before that "iron-founders, stone-merchants, and wall-paper manufacturers were only to be found in the confined warehouses of Thames-street, for which inconvenient and inaccessible premises fabulous rents were paid. Now, those wholesale traders are accommodated at lower rents in the spacious premises in Queen Victoria-street, which has become the centre of these trades." We presume the author has enquired as to the rents; he does not give any figures. About the accommodation there is no doubt, but we should have liked some statistics about the rents.

These are the reasons adduced for believing that a large scheme of London Improvement is called for and would be attended by the greatest advantages; and these are fortified by examples of what has been done in other large cities—Paris, Vienna, Berlin, Glasgow, and Birmingham. The recital of the systematic method pursued in Paris, where there is an official plan kept up of the whole city and the contemplated improvements, and a standing council of experts at the call of the Prefecture of the Seine to advise upon all architectural questions, is something so far beyond what we have got to or see any prospect of in London that we can only regard it with rather hopeless envy. The indigenous and inborn indifference of all English officialism in regard to architectural effect seems to render it doubtful whether we can ever hope to have this side of the subject systematically considered in London. If we can get a scheme of street lines adopted and worked up to, on the ground of sanitary conditions and convenience of transit, it is to be feared that this is all we can hope until a very great change comes over the English official spirit; and of such change we see no symptom at present. The Imperial Parliament sets so bad an example in this respect that it seems hopeless to expect any better of the Municipal Authority. It may moreover be noted that there seems in general to be the more chance of getting architectural improvement carried out in proportion to the independent or despotic character of the Government. The great improvements in Paris were mostly carried out under the First and Second Empire, and the immense scheme at Vienna was also carried out under a comparatively despotic rule. Republican Paris is only working now on the impulse for improvement started under the Empire, and in part indeed on the very lines laid down by the Imperial Government. The more we verge towards Republicanism, in modern life at least, the more the general tendency seems to be towards merely practical improvements, leaving beauty to take care of itself. Under a Liberal Government, with its rooted ideas of economy and reduction of taxation, it becomes the chief aim that improvements should pay in a practical sense; and those who would look to something higher than

this are too small a minority to get a practical hearing. It is said that the better educated of the working classes really care more for nobility of effect in improvements than the middle classes. If it is so, we must look for help from them, as it seems evident that their power in the community is year by year increasing.

The advantages of a comprehensive scheme for London improvement are set forth by the author very well; they are in fact only what would occur to all who understand the subject, but it is so little understood among those who are officially concerned with such schemes that this portion of the work may be strongly recommended to their attention. One most important object is that as each street is laid out, quadrants and places should be constructed exactly where future new streets would have to join them. Without a settled plan everything of this kind, if done at all, must be done at haphazard and in the dark, without any certain knowledge whether these features are really in the place where they will in future be required, and whether the cost of making them has not been partially wasted. This is so obvious that it seems extraordinary that it should even be necessary to bring it before people, but it evidently is. Amid all the schemes for improvement that have been talked over and mostly abandoned or procrastinated in the London County Council, we do not remember ever to have heard of a serious proposal to formulate any definite plan of action for London generally. The most extensive schemes discussed have only amounted to the formation of one new line of street in a given quarter, without any consideration as to its relation to future improvements. By the adoption of a comprehensive scheme, again, every small alteration and purchase of property could be regulated in accordance with its ultimate place in the whole scheme. Mr. Cawston deserves our thanks for having so decisively urged this necessary and vital principle in the improvement of a great city.

When we come to the author's proposals, however, we are not able to go with him so completely. His map of proposed new streets is calculated at once to be the despair of the projector and the terror of the ratepayer. London seems to be treated like a cheese which you can cut through at your will in every direction with streets twice or three times as wide as any now existing. As to the abstract question of width we entirely agree with the author. He makes a telling contrast between the widths of the best streets in Paris and those in London; the Avenue de Champs Elysées running for miles with a continuous width of 275 ft., as opposed to our poor 70 ft. or 80 ft. streets. But the mere sight of Mr. Cawston's map of central London as proposed to be laid out is enough to damage the effect of his book, for it is manifestly Utopian at the outset. Imagine (as a very small part of the scheme) the proposal to carry a street nearly twice as wide as Queen Victoria-street diagonally from the east end of the embankment up to the south-west corner of St. Paul's Churchyard, cutting across the premises of the *Times* as well as all the rest of the crowded property in that district. And this is only about one fiftieth part (at a guess) of the streets indicated on this map alone, all (or nearly all), carried over the face of London entirely irrespective of the disposition of the existing streets. If we chose to attempt carrying it out, it would take two centuries to do it; and we cannot make a whole city over again. Nothing but the destruction of central London by a still larger "Great Fire" could render it possible to consider such a scheme seriously. It is a pity that such a map should have been inserted, for a mere glance at it will suffice to make many people inclined to dismiss the author at once as a visionary, and indispose them to consider the really good and useful suggestions of his book. Another proposal which we must condemn utterly is that of opening up the parks, as the author

calls it, by driving large carriage avenues all across them in different directions. The author cites Paris as the example for this—the road going through the Champs Elysées, for instance. The Champs Elysées, with the wide central carriage-way and the park-terres and plantations on each side, is a gay and brilliant scene in summer no doubt, but the Champs Elysées is not a park in the true sense of the word. The very beauty and advantage of Hyde Park consists in the wide spaces of quiet and undisturbed country, as it may in a sense be called, in the midst of the great city. To turn streams of traffic through it and break up its wide spaces would simply be to spoil it. The proposal is one of the most preposterous we ever heard of in the way of a "London Improvement," and we are surprised that after the unqualified condemnation which it received when proposed in a paper read by Mr. Cawston at the Institute of Architects a little while since, he should not have recognised that such a proposal was likely to do his book more harm than good, and that there is no chance of it ever being listened to. There are other minor points in which we are quite unable to concur with him. We cannot agree in his recommendation to avoid in all cases convex corners to streets. His contention is that it leads to danger by tempting drivers to round the corner at too great a speed. Rounded corners are not very often possible, partly for architectural reasons, but it has been long recognised that they are a practical convenience to traffic—heavy traffic especially, and we do not think the author will succeed in altering the general opinion on this point. We are surprised also to see, in his comparative plans of Trafalgar-square as lately altered and as it might have been, that in the latter he adopts the architectural vandalism which was proposed some time ago, by people with the minds of surveyors rather than architects, of irretrievably spoiling the effect of the portico of St. Martin-in-the-Fields by cutting away the lower steps; a proposal fortunately stopped by the good sense of the Rector, who had it in his power to allow or disallow it. We cannot understand any architect sanctioning or recommending such a proposal.

Among other proposals with which we are more in agreement, is that it should be an object, as soon as possible, to improve the approaches to and the neighbourhood of the great railway stations, the surroundings of which are mostly wretched. We also agree in thinking that new streets should be laid out as straight as possible and of uniform width from end to end. There has been a good deal said in favour of the picturesque of winding streets, but however this may be in the case of a country town which has grown up accidentally and by following old boundaries, this kind of picturesque cannot be deliberately cooked up; an effort which always betrays itself. Besides, straight streets are healthier in a crowded city, causing less obstruction to the circulation of air. Something may be said in favour of the occasional design of a street in a regular geometrical curve, which when the roadway is wide and the houses dignified has always a fine effect; but even then there comes in the objection that the healthfulness and planning of the houses is somewhat interfered with. At any rate, a capital city is not the same thing as a country town, and demands a different and more artificial treatment.

Some of the large sketches showing portions of London as proposed are very good. That showing "Lincoln's-inn and Fields" we do not quite understand; we presume the Parisian-looking open space without railings, with trees in regular rows, monuments and basin of water and fountain in the centre, is a transformation of the present square garden; are New Square and Old Square to be pulled down? For their site, if we read the drawing right, seems thrown open in the distance. They must come down some day, for the buildings are inconvenient and cramped, yet many would

view the loss of this bit of old London with great regret. We quite agree with the author's idea that in any general scheme of improvement the British Museum should be made a kind of centre of that part of London, and have more space round it and main roads converging on it, not for the sake of access, the access to it in all directions but one is quite sufficient for practical requirements—but because it is an important and fairly imposing architectural object. All that the author says in regard to the wretched manner in which many public buildings in London are cramped and encroached upon by narrow streets and poor buildings, so that they can never be properly seen, is perfectly true, and the view given (from a photograph) of the court-yard of the Privy Council offices of the United Kingdom of Great Britain and Ireland, with the dust-bin in the centre of the picture, is a pleasant example of the kind of surroundings to be found in the immediate neighbourhood of some of our important official buildings.

The book is admirably got up and printed, and does every credit to the publisher, as well as to the author's sense of the importance of the subject. We hope it will do some good in calling attention to a much neglected and most important subject, and many of the recommendations and suggestions in it are really valuable, although the author's scheme as a whole must be regarded rather as an imagination than a scheme for practical realisation.

LEGAL PRECEDENTS IN RELATION TO BUILDING.

THE above heading expresses the actual object of Mr. Roscoe's useful little book published under the title of "A Digest of Building Cases,"* a third edition of which has just been issued. Part of the usefulness of the book consists in its brevity, a quality which brings with it the subsidiary virtue of cheapness. It is simply a statement of the results of actions in relation to building work, the judgments in which have for the present the effect of defining the state of the law on the points with which the action was concerned. The point of law is stated briefly in large type, so that it can easily be turned to, with a reference to the case which decided it; comments, including a brief statement of the circumstances of the case cited, are added in smaller type. Not a word is wasted, and the book is an admirable small compendium of what the law does and does not allow in regard to the relations of architect, employer, contractor, quantity surveyor, &c. The cases are classified in the index. The only deficiency which strikes our notice is in regard to the case of an architect's claim for payment for plans drawn and not carried out. This is a point on which there have been one or two cases which at least attracted considerable public notice recently (one has cropped up this very week, and is referred to on another page). We presume that these cases ("Burr v. Ridout" is one that occurs to us) did not lead up to conclusions sufficiently definite to form distinct precedents. But it is very desirable, especially in view of the extraordinary opinions held by one judge at least on this point, that architects should have a definite idea how far the law will bear them out in asking for payment for the most laborious half of their work, the making of the plans, when the owner has declined to proceed with the other half, the carrying-out of the building.

Perhaps we must wait for further cases before we can get a reliable and complete legal precedent on this head. In the meantime it may be of some interest to mention briefly some of the changes in the law which are of the most professional interest on this

particular subject during the last ten years. The process by which English law is largely increased by fragmentary judicial decisions, given at uncertain intervals and enshrined in legal reports, is apt to prevent the due appreciation of the alteration in the form and the substance of the law from year to year.

Let us take, for example, the important question of the architect's certificate: in the case of *Richards v. May*, decided soon after the publication of the second edition, it was decided that when it has been agreed that all extras shall be paid for at a price which shall be fixed by the architect, his certificate is conclusive, not only as to price, but as to the works being extras. We are all aware of the importance of architects' certificates on the rights of the builder, and how impossible it is for the latter to recover payment from an employer without such certificate. But the decision appears to amplify the law, and makes the architect more omnipotent, both in fact and in law, than he was before this decision.

Following up this subject, we find ourselves confronted with *Tullis v. Jacson*, decided so recently as 1892. Here again we find the power of the architect's certificate increased, though, it must be added, entirely by the action of the parties to the contract. If the parties agree that it shall not be set aside on any ground, then, even if fraud on the part of the architect is proved, the certificate is still valid. That such an agreement is very undesirable cannot be doubted; but it is an agreement which is not against public policy, and must be regarded as increasing the force and width of certificates. On the other hand, if the contractor obtains the architect's certificate by fraud, then it is invalidated, or, rather, an action would lie against the contractor to recover any sums paid by the employer in consequence of the giving of such a certificate. In the case of the Mayor of Kingston-upon-Hull v. Harding (1892), the contractor by pure deception had obtained certificates, and it was held that they were invalidated by the fraud. Moreover, in this case, sureties had guaranteed the due performance of the contractor's work, and it was further held that certificates obtained by fraud did not discharge the sureties from their liability. In this latter part of the decision we have a distinct amplification of the law so far as it affects certificates, one which is very important and will give additional safeguards to employers against dishonest contractors and builders.

If we leave the architect's certificate and come to the surveyor's quantities, we find an important development in regard to the much-discussed question of the liability of the builder to pay for quantities. In *North v. Basset* it was held that a custom, properly proved, that the builder is liable to pay for quantities, was a valid one. This may be regarded in some respects as the most important case of the decade, since it is one which affects almost every building transaction of any importance. It is a decision which, as we said at the time it was given, simply makes valid a practice which is acted upon every day of the year, which has been regarded by all men of business as one which is both reasonable and convenient. Another question of great interest in regard to quantities arises as to their accuracy. It has been held both in *Priestly and Stone* and in the quite recent case of *Le Lievre v. Gould*, that a surveyor does not impliedly warrant the accuracy of his quantities. The practical result of this is that a builder cannot sue the employer or the surveyor if he suffers loss through the quantities being inaccurate. This doctrine does not apply to an action by the employer against the surveyor, but the employer does not suffer loss by inaccurate quantities as the builder does. There is no doubt that this state of the law is not satisfactory, but it is difficult to see how it can be altered, because there is no privity of contract between the builder and the surveyor. There is no doubt that quantities, if taken out with due care, must be accurate:

they are not based on opinion or on judgment, but on rule-of-thumb measurement. Be that as it may, during the last ten years the law in this respect has been clearly formulated, and for the present, at any rate, it must be accepted as it stands.

NOTES.

THE new fountain at the foot of Shaftesbury-avenue is unquestionably, as might have been expected, a far higher work of art than most of our modern street erections; in fact it stands quite alone among recent works of this kind in London. Nevertheless we must confess to a certain degree of disappointment in regard to it. The outline is rather heavy, and in some of the details the work seems a little too much like a revival not only of the freedom and vigour of Renaissance design, but to some extent of the defects in what one may call the logic of design, which are also characteristic of a good deal of Renaissance art. For instance, the lower jets of water do not emerge from anything which seems designed to spout out water, but slip out in a thin sheet from beneath a little collection of three cherubs' heads thrown together in a knot, and having no relation to the object of the design at this point. The details are rather *rococo* in style and feeling, though redeemed by vigorous modelling. The best bit in the purely decorative portion of the design is the treatment of the exterior of the lower basin, with the small bas-relief figures following the curves of the exterior surface of the basin. The figure poised on tip-toe on the top of the fountain is full of spirit, though it is not very easy to see what is its relation to the object of the fountain or what it is shooting an arrow at, and why. The curled-up fish on the outer sides of the upper basin are very spirited and the whole of this part of the treatment is effective; what we do not like is the heavy and "lumpy" surface of the lower portion of this basin, which suggests nothing in particular and is to our thinking wanting in decision of line. This portion needs to be what we may call a little more "architecturalised," and this is the more apparent by contrast with the admirable architectural character of the lower basin. However, it is a great thing to have a fountain in a prominent position in London which is not feeble or commonplace, and which affords a precedent—we hope to be followed in other instances—for the employment of an eminent artist to produce a design, instead of a trade-pattern casting like some of the new lamp-posts in central positions in the streets. The contrast between the central lamp-post in the triangular space at the top of Shaftesbury-avenue, and the fountain at the bottom, is indeed an instructive one: trade-work at one end of the street, art-work at the other. It is to be hoped the public may learn to appreciate the distinction.

IN glancing over the contents of the new number of the *Bulletin de Correspondance Hellénique* (1893, i-iv.), we naturally turn first to the news from Delphi. The difficulties that beset the excavations there are perhaps not clearly realised. To evict a whole village of 250 inhabitants is no light matter, and it is not expected that the last remaining hut of Kastri will be pulled down till the end of September. We have already called attention to the discovery of the Treasury of the Athenians—important both for its own architectural interest and in furnishing a fixed topographical point. The *Bulletin* gives some further particulars: The building is about 10 mètres long, it is of Pentelic marble, and executed in a style of remarkable delicacy. Sufficient architectural fragments have been found scattered about not merely to conjecturally restore the Treasury, but almost to rebuild it. Many fragments are preserved of singular freshness and entirety; some

* A Digest of Building Cases, relating to the Construction of Buildings, the Liability and Rights of Architects, Surveyors, and Builders in relation thereto. With Notes, by Edward Stanley Roscoe, Barrister-at-law. Third Edition. London: Reeves & Turner. 1893.

have traces of vivid colouring. Fragments of sculpture probably belong to five metres; those best preserved represent Athene, Herakles, a Centaur, figures fighting, and animals. Certain figures sculptured on the round seem to have come from pediments. The discovery of these remains is of good augury; they seem to show that the ancient monuments at Delphi have not been to any great extent either carried off piece by piece or thrown down, as some have feared, into the river Pleistos.

CAN no one make it evident to the mind of the Lord Chief Justice of England that an architect's work does not consist only in superintending the erection of a building, but in making out and studying the plans and designs for it, and that the latter is often the most important and laborious portion of the work? One would have hoped that his recent correspondence with the President of the Institute of Architects on the subject would have opened Lord Coleridge's mind a little to the facts; but in trying the case of *Farthing v. Tomkins*, in which the plaintiff claimed 3 per cent. for commission and quantities on a building planned but not carried out, we find the Judge again reciting his former superstition that an architect has done no work unless he has produced a building. It is really too ridiculous that the leading Judge on the Bench cannot be got to understand in what an architect's work consists. We take the following from the *Times* report of the case:—

"Lord Coleridge desired it to be understood that he should not allow the plaintiff to recover for more than work done. He did not understand the claim of commission at 3 per cent. on the £1,800*l.* Such claims had, he said, been set up on former occasions and on the authority of the Institute of Architects, but had never been allowed.

Mr. Wilt said the full work had been done—the plans and specifications drawn and the quantities calculated—and it was not the architect's fault that the building could not go on.

Lord Coleridge said the work of the architect for which the commission was to be paid had not been done; the building was never done.

Mr. Dickens said there was a similar case '*Burr v. Ridout*' (reported in the *Times* February 22 last) in which his Lordship had ruled in the same way.

Lord Coleridge said he should always so hold. The architect in such a case could only recover for work done."

We presume, on the same principle, Lord Coleridge would decree that if a solicitor had drawn up the necessary deeds, say for a large transfer of property, and the intended dealing with the property was afterwards abandoned, the solicitor would have no claim to any fees. That is a strictly parallel case, and we should like to hear what lawyers would say to the proposal to apply the same treatment to them. We have no particular sympathy with the plaintiff in this case; he seems to have gone into a good many matters which were not architecture, and he claimed commission on £1,800*l.* because the builder's estimates had come to that, although he had been instructed to prepare plans for a building to cost 8,000*l.* We have always been of opinion that in such a case, when the building is abandoned, the architect ought not in honour to charge commission more than the sum he was instructed to spend. But for the highest Judge on the Bench to assert that in such a case an architect has no right to the half-commission on the most important part of the work, which he has already done, affords a most extraordinary instance of the want of logic which occasionally characterises the legal mind. We presume the real explanation is that lawyers, or some of them, cannot understand the nature of an architect's work. In that case they surely ought to take instruction from some one who does understand it. The result of such ruling as this is simply the judicial robbery of the architect.

IT is not at all improbable that we are on the eve of another struggle between the coal-owners and miners, in consequence of the masters having announced that the

languid state of trade and falling prices necessitate a reduction of 25 per cent. in wages. Their contention is that they have hitherto borne the brunt of the battle, and that it is now for the men to stand by them and submit to a reduction in order to enable them to carry on business without loss. The Miners' Federation, having recently secured the adhesion of the Northumberland men, will undoubtedly resist the proposal as it stands, and unless a compromise can be effected, another great strike or lock-out appears inevitable. The miners of Northumberland are at the present time receiving some 15 per cent. lower wages than those of the districts which joined the Federation earlier; and it is not unlikely that they will seize the opportunity of endeavouring to improve their position. It is, however, well known that the men in receipt of the lower rate of wages have for some time past had far more work than those who secured the advanced rates—orders being naturally placed where prices have ruled low. The relatively small demand for coal at the present time will be an important factor in determining the course of events. The Federation can do much in the way of controlling wages, but their influence upon the demand for the commodity they supply is limited to the spasmodic and shortlived movements peculiar to a disturbed condition of trade. They will doubtless recognise that the coal-owners are too astute to have suggested a wholesale reduction at a time when the Federation is better organised than it ever was before, unless they felt that they had no option. Meetings are being held all over the country at which the miners in the various districts affected will decide what course to support at the general conference to be held at Birmingham later in the month.

IT is very satisfactory that the County Council have rejected the proposal to spend 750,000*l.* on a site for offices at Westminster. It is to be hoped that the last has been heard of the scheme. But it is by no means to the credit of the Council that it should be necessary for Lord Rosebery to come down and make a long speech against the proposal. It is pretty clear that had it not been for his energetic speech the Council would have adopted the proposed scheme. The mere fact that a powerful Statesman should have to use his personal influence against the proposal shows how little real businesslike capacity exists in the Council. The commonsense of the body should have rejected the proposal in its inception. Moreover it is not a satisfactory symptom that the personal influence of an eminent person can control the Council when their own instincts should have been sufficient. The whole affair, from whatever point of view it may be regarded, is a blow to the character of the Council. They have been saved from a gross blunder, but simply and solely because Lord Rosebery has treated them as a parcel of schoolboys.

WE have received a pamphlet entitled "Strike in the Building Trade," which urges upon employers the need of organisation to counterbalance the combination of workmen. There is no doubt that this is sound advice, because it is certain that in such a trade as that of a builder there are so many masters all over the country in a comparatively isolated position when a strike arises that it is only by previous combination that employers can successfully resist an organised attack. It is equally certain that when strikes take place employers should watch the proceedings of "pickets" with great closeness, and urge on the authorities the necessity for protecting non-union workmen. At present the authorities let the pickets severely alone, and the mere presence of the latter is sufficient to keep away men who do not like to run the gauntlet of a crowd of angry workmen. Some day the question of picketing will have to be reconsidered by the Legislature.

THE Report to the Local Government Board by Dr. W. W. E. Fletcher on the sanitary circumstances of the Risca Urban Sanitary District, seems to point to defective water supply as the worst evil in the district. On this head the report says:—

"Until very recently there was no public water service in the place, and the only available sources of supply were those which I shall presently describe. Lately, however, the Monmouthshire Valleys Water Company has laid mains down some of the roads in Risca, and up to the time of my inspection the company's supply had been laid on to seventy-two dwellings. The sources of supply, which are being superseded by the introduction of the above mains, are of an extremely unsatisfactory character, consisting, as they do, of several sprouts and springs, some of them open to all sorts of contamination.

The chief of these appears to be a spout by the 'Long Bridge,' on the confines of Pontymister and Risca. This water is piped from the mountain on the north-east side of the valley. It is bright and clear, and the spout is resorted to by a great number of the inhabitants, some of them residing at a considerable distance. Another supply is provided by a 'spring' in a field near 'the forge.' This spring is merely a shallow hole two yards distant from a brook from which the water in question is most probably derived. About ten yards above the spring, on the opposite side of the brook, is a dilapidated privy abutting on the stream. At the time of my visit the level of the filth in the privy-pit was some inches lower than that of the water in the brook, but only a narrow dam of clay interposed between the contents of the privy and the stream, so that mingling of the water with the privy contents, or overflow of the latter into the brook, might easily take place. In other instances water is derived from shallow surface wells very imperfectly stoned, and so circumstanced that contamination of their water is almost certain. Some of the inhabitants obtain their water from springs in their own gardens. I saw two such 'springs,' in reality mere shallow holes in the ground. One of these holes, in a garden lately and liberally manured, supplies all the water used in one of the public bakehouses."

Drainage of domestic premises, we are told, hardly exists. Liquid refuse is thrown anywhere and everywhere; into the gardens, into the roads, into middens, and into brooks. In regard to excrement disposal we have the old story; privy pits, the scavenging of which is left to the occupiers, with the usual results in rural districts.

THE Ceylon Official Customs Returns for 1892, which have just been published, show that the value of imports last year amounted to 4,417,968*l.*, and exports to 3,891,997*l.*, making a total of 8,309,965*l.* The returns show that the trade of the Colony has steadily increased since 1885. Among the imports having a special interest for English manufacturers, we may mention the following (the figures showing the value of each class of article imported last year):—Bricks and tiles, 16,948*l.*; cement, 16,000*l.*; furniture, 5,220*l.*; iron (angle, bolt, bar, and rod), 10,479*l.*; iron (galvanized), 18,021*l.*; iron (pig, plate, and sheet), 1,868*l.*; hoop-iron, 14,306*l.*; iron tanks, 1,732*l.*; railway materials, 24,783*l.*; steel, 1,241*l.*; tin, spelter and zinc in plates, bars, and slabs, &c., 1,914*l.*

A LAVATORY for use by visitors to the Park is being built near Cumberland Gate, and opposite the corner of Edgware and Bayswater roads. The new structure, which is of stone, is designed after the style of the older park-lodges, having a pediment resting upon four Doric columns. The builders are Messrs. G. H. & A. Bywaters, of King-street, Regent-street, W. Messrs. John Bolding & Sons, of Grosvenor Works, W., will supply the sanitary fittings. This is the most recent change at a corner of London which has seen many changes. Close by where the Marble Arch now stands once stood the old Cumberland Gate, a mean brick arch with side wickets, opened *circa* 1745, which was pulled down in 1822 for the iron gates presented by Mr. H. P. Hope. In 1851 the latter were shifted to stand on either side of the Marble Arch, removed from before Buckingham Palace. The Marble Arch, which is said to have cost 80,000*l.*, and was intended to carry Chantrey's equestrian statue of George IV., now in Trafalgar-square, is an adaptation by

Nash; its sculptured pieces are the work of Flaxman, Rossi, and Westmacott; the gates, of a copper alloy, were designed and cast by Samuel Parker.

WE are not very often in accordance with the Society for the Preservation of Ancient Buildings, but in the matter of the proposed restoration of William of Wykeham's chantry at Winchester we are inclined to think that they are in the right. It is understood that there is a desire to replace the statues, which Bishop Horne removed from their niches, with modern ones. We should be disposed to leave the chantry as it is, and simply preserve it from further injury. The modern statues will not harmonise with the monument.

CONGRESS OF FRENCH ARCHITECTS.

WE give a few notes on some of the visits made by the French architects during the recent Congress, which afford an opportunity for describing one or two buildings of interest.

The first visit, made on Tuesday, June 20, was to the Hôtel des Téléphones in the Rue Guttenberg, a street recently opened between the Rue du Louvre and the Rue Jean Jacques Rousseau, behind the Hôtel des Postes, to which it forms a kind of an annex.

The building is an odd-looking structure with no pretence to be architecture of a classic character. M. Bousnard, the architect, already known for his originality in the design of various private residences, has based his design on the employment of the most economical and most easily utilised materials. Massive piers and an arcade of round arches support two stories of glazed galleries, the iron construction of which, painted light blue, is filled in with enamelled brick, also of a blue tint, but less marked. Prows of ships, in terra cotta, decorate the façade; at the angle of the streets is a circular tower lighted by bays rounded on plan in the lower story and rectangular above. Behind the front block is a garden surrounded by plain brick façades of Flemish aspect, with large bay windows lighting the staircases. The steps of these stairs are of compressed concrete, and carried on brick arches which render them independent of the main construction. There is a certain grandeur and boldness of treatment about this part of the building. The only internal ornament having an artistic character is a fresco decoration in the entrance vestibule, consisting of groups symbolising the employment of the telephone.

The large room of the first floor is lined with panels of enamelled faience with very original effect, resembling the *revêtements* of walls used in the south of France. The floor is covered with a thick carpet of cork and gutta-percha united to form a material which renders the footfall absolutely silent. In the upper story is a large, well-lighted, and airy room, where is placed the apparatus serving for the use of the 6,000 subscribers to the telephone system of Paris, who are divided into groups of not more than eighty in each group. M. Bertrand, the engineer of the system, here gave some interesting explanations on the installation, in which all isolated offices are suppressed. In the basement, built entirely of stone, are the large cables serving for communication between France and foreign countries. It is hoped that the building will be opened in two months. The *employés*, as well as the public, will find a degree of comfort in it which is little known hitherto in the large administrative buildings of France. In particular, M. Bousnard has broken through the routine system of warming and ventilation followed in all the recent Government buildings (even in the Hôtel de Ville), and adopted the "aero-calorifier" system, which he considers infinitely superior to either the ordinary warmed air or hot-water system, and which is contrived to give at the same time the requisite degree of moisture to the air.

On June the 21st the Congress visited the Gobelins tapestry works, in the neighbourhood of the Jardin des Plantes, where it occupies an immense range of buildings divided by large silent courtyards. The establishment is so well known to visitors to Paris, however, that it is hardly necessary here to describe it in detail. We may mention, however, that after the fires caused in the Commune insurrection in 1871, which destroyed seventy-six tapestries and ruined many blocks of buildings, there still remained four ateliers, that of the "haute lisse," including eleven separate industries; that of the Savonnerie,

that of the "rentraitures" (atelier for repairs), and that of "teintures." Adjoining these technical departments is the museum and the school of design, the former open to the public.

The interior organisation of the manufacture, which is not much known, offers a certain degree of interest. Most of the operatives live on the premises, and each of them has a garden on a large territory of several acres, on the banks of the Bièvre; this collection of gardens forming a charming adjunct to the industrial buildings, leaving an impression on the mind of verdure flowers and sunshine, as if one had paid a visit to the country. The artisans form a large and very united family, devoted to an art which has been handed down and pursued from generation to generation, undisturbed by political and social changes.

Of the ateliers which escaped the destruction of the Commune period, most date from the seventeenth century, and are in a rather dilapidated condition. The atelier de teinture, which is as old as the time of Henri IV., is, in fact, approaching the condition of a "dangerous structure." But though air and light are not very well provided for in these old buildings, they are on the other hand full of picturesque corners, and it is interesting to see still the remains of the atelier of the celebrated painter Lebrun, who lived in a stone parlour surrounded by elms. Past generations seem to revive again among these ancient walls and peaked roofs, stained and browned by time.

On leaving the Gobelins, the members of the Congress went to see the new Mairie of the thirteenth arrondissement in the Place d'Italie, which, though built in 1877, is already inadequate for its requirements, and M. Soudée, the architect, has been commissioned to prepare plans for its enlargement. This mairie contains an important piece of decoration by M. Gustave Boulanger, entitled "Matrimonium," in which are introduced the portrait of a certain number of eminent men—Chas. Garnier, Alexandre Dumas, Cabanel, Arago, and others.

The excursion to Amiens, on Thursday, June 22, was very interesting to those who attended it, but Amiens is so well known to English students of architecture that we need not do more than mention the programme of the day. On arriving at Amiens at 10.30, the excursionists were received by M. Leullier, architect to the corporation of Amiens, who conducted them first to the apprentices' school of the Société Industrielle. The party then proceeded, under the direction of M. Juste-Lisch, to the Cathedral, and afterwards met at the Hôtel Créaux for lunch, opposite to the Hôtel de Ville, in which, in 1802, was signed the celebrated treaty of peace of Amiens. The members afterwards went to see the Musée de Picardie, a work of the late M. Diet, where they admired the masterly decorations of M. Puvion de Chavannes—"Le Repos," "Le Travail," "Bellum et Concordia," &c. On leaving the Museum the party went to the *chantier* of the Church of St. Remy, in process of construction under M. Deleforterie, the architect. Various Renaissance houses—that of the "Sagittaire" Rue des Vergeaux, and the half-timber houses of the Rue des Poires, were also visited, and the last part of the day was passed in the *chantier* of the Church of the Sacré Cœur, in process of construction from the plans of M. Douillet.

This closed the "extra-mural" excursion, which is always one of the features of the Annual Congress.

ROYAL COMMISSION ON METROPOLITAN WATER SUPPLY.*

THE Commission last week devoted a second day to the examination of Mr. Wilson, of the Middlesbrough and Stockton Water Board; and at its conclusion the Chairman said for himself and his colleagues that they were very much obliged to Mr. Wilson for the trouble he had taken and the promptitude he had shown in giving all the information he could. Dr. Barry has also been examined by way of rejoinder to Mr. Wilson and in vindication of his own reports. The Commission wished to ignore the interim report and to deal only with the final report, which is as yet a confidential document, and is not expected to be issued to the public for some time. Mr. Wilson, however, referred on certain points to the interim report, because he said it remained an official document, and it stated much more clearly than did the final report the reasons that brought Dr. Barry to the conclusion that it was the Tees water which produced the epidemic. He added

that, so far as he had seen the final report, it did not give any reasons whatever; but in it Dr. Barry dropped the things he considered crucial in his interim report and went into big generalities.

It appears probable (as was indicated in our Notes last month) that, irrespective of the problems raised as to the concurrence of fever with the Tees water supply, much will depend upon the character of the Tees itself, its pollutions, and the general provision for subsidence and filtration; and scattered through Mr. Wilson's evidence there is a good deal of information of a suggestive character, especially when taken in connexion with the ideas that have been evolved as to the importance of effective filtration. Mr. Wilson said,—

According to my theory the river had nothing to do with the outbreak of typhoid fever; that had to do with the local rainfall conditions. There was a rainfall in Stockton which exactly coincided in its date with the batch of cases which resulted from it; there was not that rainfall in Darlington, and therefore it did not get that hold. Over and over again I find that coincidence—excessive rainfall in Middlesbrough and Stockton, followed at a certain interval by a batch of deaths. Going back into the history of Middlesbrough as far as 1868 I find precisely the same thing takes place.

The Chairman: With a candour that does you the greatest possible credit you say, "It can hardly be said to have had any culmination at all in Darlington, probably, as may be suggested, because the Darlington Corporation had ceased to pump water during flood time in the river." Do you know when they ceased to pump it?—I am not sure; I know that they so altered their engines and their pipes that they are now able to cease pumping water in flood times, and therefore they save their filters a very great deal. Exactly what time that took place I do not know, but the arrangement is that they keep a reserve reservoir with about one and a-half to two days' supply, and they bring that back to the pumps and re-pump it.

Did it take it December, 1890?—I do not know the date; but I know that they do not pump now in dirty weather—when the river is turbid.

Carry your mind back, please, to the autumn of 1890. What storage capacity had you then in days' supply; how many days' supply could you store?—Above the filters or below the filters?

Either above or below—first one and then the other?—At the works we will have 12,000,000 galls. of storage; at the different service reservoirs, 37,000,000; I think it is altogether 49,000,000.

How many days' supply is that?—That would be about five days'.

In 1890, do you mean?—Yes; we are precisely the same as we have been for the last eight or nine years. There is no alteration. It would be that if it was all filled.

At what rate did you filter the water?—At the average rate of five inches an hour. Take it in this way. Our average weekly pumping may be taken at 63,000,000; the daily, at 9,000,000; and the hourly, at 375,000 galls. Then the area of the filter-bed is 142,100 ft., and if we divide the 375,000 galls. by the 142,100 ft. of filter-beds, that gives 2.64 galls. per foot of filter and 2.64 galls. is 42 of a cubic foot, or 5 in. So that it may be taken at 5 in. in an hour. Of course, when the river is dirty and the river is coming rather muddy, it would not come quite so fast through. Then we make up the average by getting it a little faster through when the water is very clear, but the average rate is 5 in.

What is your storage before filtration?—12,000,000 gallons.

About a day and a half's supply?—About a day and a half's.

Mr. Hill: Twenty-three millions after it has been filtered—is that the storage?—Thirty-seven millions after it has been filtered—if it were full, about that.

So that if the filters do not pass the water through freely enough because it is turbid, you draw then upon the water which has been already filtered?—Draw on the service reservoirs.

Chairman: I suppose with a river running down a valley of the configuration of the Tees Valley, the floods are, you would say, short and heavy, are not they?—Short and heavy.

Now in the absence of floods, at what intervals do you clean your filter-beds?—There is no stated interval. It is governed entirely by the state they happen to be in. If the river has had a long course of clear water they would go for a considerable length of time.

What do you mean by a considerable length of time?—I keep no exact record and I cannot say, but I should think they would very rarely indeed go above two months.

Then if the floods should happen to come in rapid succession they would not go so long, I suppose?—Oh, no. It very frequently happens that the water coming down very thick the filter gets so blocked up that we cannot get the water through it. Then we let it drain away, and we skim off as quickly as we can—take the skim away to a place for washing.

Take the deposit off the top of the filter-bed?—Yes, then get to work as quickly as possible. How often will you do that in rapid succession?—We have had to do it twice in the course of a single day.

* For reports of previous sittings of the Commission, see the last three volumes of the *Builder*.

leading directly to the Church of St. Mary-le-Strand.

From the circus in Lincoln's Inn-fields the street would be inclined towards the Strand, 70 ft. wide, and pass under a bridge or viaduct at Surrey-street to the level of the approach to the Victoria Embankment. The bridge or viaduct is denoted on the plan by the dotted diagonal lines. The buildings on the west side of Lincoln's Inn-fields would remain, their fore-courts being added to the new street.

It is proposed to continue the present street on the east side of Lincoln's Inn-fields to Holborn, and to improve the access to Waterloo Bridge by widening a portion of the Strand.

MAGAZINES AND REVIEWS.

The *Art Journal* continues the articles on the Tate collection by Mr. Armstrong, and devotes a short and sympathetic article to "Sir John Gilbert's gift to the City of London." The most interesting article in the number, perhaps, is that by Mr. M. W. Freeman on "A Sea-going Studio," being an illustrated account of the two ships which Mr. Napier Hemy has successively had built to enable him to carry on his sea-studies. The first one, the *Van de Velde*, got ashore and came to grief, and the *Vander-Meer* was specially designed "to combine the speed of a racer and the steadiness of a coal-hulk." This, we gather has been achieved, and the interior of the cabin and studio certainly looks roomy and comfortable, though it makes rather a lump on deck externally. An article on the late Mr. Pettie is accompanied by illustrations of some of his best works, and Mr. Huish contributes a well illustrated article on the oriental art collection of Sir Trevor Lawrence.

In the *Magazine of Art* the New Gallery is criticised by Mr. Wedmore, and the Academy Exhibition by the Editor. Mr. J. E. Hodgson contributes an interesting article on "Sketching from Nature," an article full of good sense lighted up by insight and enthusiasm, and which should be read by all amateurs sketchers. "Street balconies in North Italy," by Mr. H. E. Tidmarsh, contains some admirable illustrations drawn by himself, and is of special interest, of course, to architects.

Art does not take much place in the general magazines of this month. "The Arts and Crafts Exhibition at Westminster," in the *Nineteenth Century*, is, as the reader may surmise, political and not artistic. Mr. Taylor's article on "How to Catalogue Books," in the same magazine, may be useful to those who are concerned in the planning of libraries, for one may suppose that the grouping of the books should have some reference to the grouping of the catalogue, and be arranged for accordingly.

Harper contains an article on "Italian gardens" by Mr. C. A. Platt, with illustrations from photographs of some old palatial gardens, some well known, some that are not. In the *Fortnightly* Mr. Grant Allen indulges in a satiric condemnation of the City which he calls ironically "beautiful London," and there is much truth in his remarks, but they are somewhat overdrawn—at least there is much beauty in London which he does not appear to recognise. It is beauty of a small type however, always excepting St. Paul's and the Houses of Parliament; the lack of palatial dignity and stateliness in a city so wealthy is certainly a phenomenon, and it is well that attention should be called to it in this way, though we fear it is hopeless to expect that any steps worth speaking of will ever be taken to improve it in this respect. We live under a Legislature which (Liberal and Conservative alike, or nearly so—the Liberals are the worse in this respect) prefers economy to art. Miss F. March-Phillips's article on the "Progress of Women's Trade Unions" is a serious one, written indeed all on one side, but it is the weak side at present.

In *Scribner*, Mr. W. Hamilton Gibson fairly loses his head, in an article on "Foreground and Vista at the Fair" (Chicago, of course), over the architectural glories of the Exhibition. The American writers seem determined that if we do not admire it enough, it shall not be for want of being told to do so. The "supreme glorification" and "superb achievement" of Chicago "still leaves us the superlative of actual experience"; and so on. The sketches illustrating the article (by the author) are admirable, but the writing is really too much of "tall talk."

The *Century* commences also with a Chicago article, "Colour in the Court of Honour at the Fair," by Mr. Cortison, written likewise in *couleur de rose* style, and illustrated by a very charming series of engravings of the decorations of the domes of the Manufactures and Liberal Arts building.

These are by various artists, but a certain unity of method runs through them, as it should and was probably intended to do. All the painters seem to have adopted the system of emphasising the pendentives of the dome by figure subjects, leaving the hemispherical portion nearly clear, or only very lightly decorated. The arrangement is effective, and there is a fine freedom and variety in the designs. Mr. La Farge contributes "An Artist's Letters from Japan," which is not only interesting in its information, but contains some admirable critical remarks on artistic aims and methods, suggested by the spirit of Japanese art. A fine engraving of Gainsborough's "Mrs. Siddons" forms the frontispiece to the number.

Blackwood contains a short account of a remarkable illuminated book of the Renaissance period, the "Sforza Book of Hours," a fifteenth century book which was offered for sale in 1871 at Madrid, and was purchased by Sir J. C. Robinson, and by him offered to the trustees of the British Museum for 2,500*l*. The Museum had not the funds—the purse-strings of the nation were then held by a Liberal Chancellor of the Exchequer," and Mr. Malcolm of Poltalloch bought it at a higher price than the Museum had refused, and eventually presented it to the nation. It is described as "illuminated throughout with the richness and beauty which belong to Italian and Flemish specimens of such works at the best periods of those schools." Its pages are adorned with sixty-three full-page illustrations, forty-seven of which are by Milanese artists, and the remainder by equally skilled Flemish painters," besides numerous borders of exquisite design and workmanship. The same number of *Blackwood* contains a short story, "A Tale of Two Studios," turning on an artistic subject.

The third number of the *Pall Mall Magazine* gives it the claim to be the best illustrated English magazine, the only one to compare in this sense with the best American illustrated periodicals. We can only wish that the literary portion were equal in merit and interest to the illustrations. The article on the "Follies of Fashion" reproduces a number of curious and elaborate caricatures of period of high head-dresses. "Deal Beach," by Mr. Sydney Gerald, is a picturesquely-written article in a light style, illustrated by a number of small sketches. Mr. Aubrey Beardsley's curious fancy, "The Kiss of Judas," is remarkably original as a piece of decorative effect in black and white.

In the *English Illustrated* Mr. Harry Quilter writes some very true words about "Art Eternal and Temporary," endeavouring to distinguish between the qualities which give permanent interest and beauty to a work of art, and those which belong only to temporary fancy or fashion. The subject is well worth taking up, and Mr. Quilter has a good deal to say about it which is forcible and to the point. We are specially struck by the remark that "the very fact that certain recent developments of English artists have been received with such vehement applause by the Press critics is the strongest proof of the entirely temporary nature of their appeal." In concluding his article the writer suggests the institution of competitions for great decorative designs in painting and sculpture, the work of the finally successful competitor (after a preliminary competition to justify entry) to be purchased for the nation, and its author to have the right to exhibit for three or more successive years at the Royal Academy. We should be very glad to see some such scheme carried out.

In the *Cornhill* "Nile Notes" gives a sketch of a voyage up the Nile with a good deal of "local colour," and an article on "Texts and Mottoes" inscribed on old buildings is of interest, and gives a curious collection of examples.

The *Newbury House Magazine* includes a short article by Mr. W. Arthur Webb on "St. Mary Overie and its Restoration," with illustrative sketches.

The *Reliquary* contains the continuation of a series of articles by Mr. C. C. Hodges on "The Pre-Conquest Churches of Northumbria," which are very valuable, being the putting on record with pen and pencil of a number of interesting ancient features, some of which have been with difficulty preserved from the hand of the restorer, by an architect who has made a special study of the subject. Among other articles containing a good deal of special information is one by Mr. J. Hunter-Duvar on "The Dawn of Design," illustrated by fac-similes from pre-historic drawings. The subject is one of the most fascinating interest, though of course far too large to be disposed of in a single article.

The *Antiquary* continues "Researches in Crete" and "Archæology in Provincial

Museums." Mr. Peacock commences a contribution, to be continued, on "Gainsburgh During the Great Civil War." A correspondence is going on in the columns of the *Antiquary* in regard to "Nonnan Work in the Triforium of Beverley Minster," on which the Vicar of Beverley writes a long letter, in reply to a letter by Mr. Bilson in the previous number.

ARCHITECTURAL ASSOCIATION

SUMMER VISITS:

GREENWICH HOSPITAL.

ON Saturday, the 24th ult., a large party of members of the Architectural Association journeyed by boat to visit the famous buildings, now no longer a hospital for aged seamen, but a training school for young naval officers, and more correctly styled "The Royal Naval College." It has probably been forgotten by many who look on the present buildings that they occupy the site of the royal palace built by Humphrey, Duke of Gloucester, and afterwards the birthplace of Henry VIII. and Queens Mary and Elizabeth. The cellars of this old palace partly remain, and were visited by the party, who inspected the red brick vaulting and stone piers. Some doubt appears to exist as to the precise authorship of much of the present buildings. Inigo Jones was employed by Queen Henrietta Maria, but whether he designed more than the building next the Park, now occupied as the Seamen's Orphanage, is open to question. The palace was converted into a seamen's hospital by Queen Mary, to commemorate the battle of La Hogue in 1692, and Sir Christopher Wren was instructed in 1694 to erect further additions, but whether he or his son-in-law, Webb, did so, is questioned. Probably Webb acted as the "ghost," whose real design was supervised and fathered by Sir Christopher. It is manifestly impossible that Wren could personally have designed altogether the many works all over the country with which he is credited, and at the same time devote that attention to his Sovereign which his position as a courtier demanded. The chapel was, we know, remodelled internally, after a fire, by Stuart, the joint author of the "Antiquities of Athens" and other publications of the Dilettanti Society. It is interesting to see the way in which Stuart made use here of the knowledge of Greek detail thus gained, and the satisfactory result obtained. The "Painted Hall" and its pictures, including the decorative designs of Sir James Thornhill, are too well known to need more than a mere mention.

DAILY'S THEATRE, LEICESTER SQUARE.

A large party of members visited this building on Saturday last, but owing to preparations for an afternoon performance being in full career, were unable to see more than the part of the house ordinarily accessible to the public. A description, with illustrations of plan, section, and elevation, appeared in the *Builder* for November 14, 1891. The decorations, therefore, were the chief item of interest, and these have been carried out by Mr. Lock, of Collinson & Lock, and that gentleman met the party and explained various points. The scheme of decoration for the auditorium is conceived in warm rich tones of red and gold, the metallic enrichment being carried out in silver leaf covered with variously tinted lacquers, by which greater depth, warmth, and variety of effect is obtained than by gilding in the ordinary way. The scheme of the principal entrance and foyer is rather cooler and lighter in tone, the hall being finished in white with stained mahogany joinery. The modelling throughout is well executed and preserves more of clay technique than is usually seen in plaster decorations.

"THE BIBLE AND CROWN."—It is announced that Mr. Septimus Rivington and Mr. J. G. Percival (a son of the headmaster of Rugby) will continue the publishing firm of Percival & Co., of 34, King-street, Covent Garden, under the new style of Rivington, Percival, & Co. Mr. Rivington was formerly (1867-89) a partner in the late firm of Messrs. Rivington, Waterloo-place. There, on the east-side over the door, is the sign of the "Bible and Crown," with which the name of Rivington has been associated in the publishing trade for nearly two hundred years. At the "Bible and Crown," in Paternoster-row, the Rivingtons continued, with Burke's help, the *Annual Register*, established by Todsley at the "Tully's Head," in Pall Mall, and there, in 1791, they began the *British Critic*. In 1854 their house in "the Row" was converted into a shawl-shop, the firm having removed in the previous year, we believe, to Waterloo-place.

Illustrations.

BATTERSEA TOWN HALL.

WE published the elevation and plan of this building in our issue for December 19, 1891, at the time the competition was decided. The illustration here given is from a perspective view exhibited at the Royal Academy. The exterior of the building is faced with red brick and Monk's Park Bath stone, the whole of the lower story being faced with stone. The roof is covered with green Westmoreland slates, from the Tilberthwaite quarries. The roof-turrets are framed of oak covered with copper.

Internally, the principal staircase will be of marble, with handrails of Devonshire marble and balusters of Devonshire spar. The balustrade, of the same materials, is continued round the gallery which surrounds the staircase.

This gallery has a vaulted ceiling. The public hall and council chamber have decorated plaster ceilings of an arched form. The entrance to the public hall is surmounted by a dome, carried on columns of polished Devonshire marble.

The principal rooms are floored with oak, and the council chamber is panelled with the same material. The entrance-halls and corridors are paved throughout with Rust's glass mosaic.

As before stated, the carving of the figure subjects on the front elevation is by Mr. Paul Monford; the rest of the carving is executed by Mr. Gilbert Seale. Messrs. Shand, Mason, & Co. have done the fire hydrants and fittings; Messrs. Berry & Sons have fitted the heating apparatus; and the principal roofs are constructed of steel by Messrs. Morland & Sons. The builder is Mr. Walter Wallis, of Balham, who has carried out the work very satisfactorily.

The clerk of works is Mr. Isaac Gard, and Mr. Ed. W. Mountford is the architect, who gained the commission as the result of a limited competition.

We may add that in addition to the illustrations already named, we published a view of the principal staircase of the building in our issue for July 9, 1892.

YORKSHIRE COLLEGE: LEEDS SCHOOL OF MEDICINE.

THE new buildings, to serve as the Medical Department of the Yorkshire College, are being erected by the Council of the College on the Mount Pleasant Estate, adjoining the Leeds Infirmary, and are arranged to accommodate 400 students. They supersede the old buildings in Park-street, which have become quite inadequate for the work.

The site is a commanding one of irregular shape, with street frontages on each side, and with rather rapid falls. The buildings now in progress are arranged on three sides only, leaving a large interior court, but allowing of extension on the fourth side when rendered necessary.

A leading requirement in the arrangement of the plans was the localisation of the separate departments. Generally speaking, it may be said that the library and museum departments occupy the southern wing; the administrative department, board-room, common rooms, &c., are in the south-east portion, near the principal entrance. Beneath these are the students' smoke-room and a large dining-room, level with the courtyard, provided with the requisite kitchen and store accommodation. The pathological department (with general lecture theatre for pathology, materia medica, &c.), occupies the north-eastern portion of the ground floor.

The physiology rooms are located in the north wing, and occupy the ground floor and the floor above: while the anatomy department adjoins them on the first floor of the east-wing, and has additional rooms on the second floor.

The varying levels of the site admit of the janitor's house in the N.W. corner, with the adjoining rooms, being above the street level, though nominally in the basement; and also allowed increased height to the library wing, thus admitting of mezzanine rooms, where work rooms and other accommodations of lesser importance are required.

The principal entrance, in Thoresby Place, which is surmounted by a tower, forming a prominent feature of the building, gives access to the entrance hall. This is a hexagon on plan 25 ft. diameter, with arcaded sides walled in faience, and provided with a groined oak ceiling. The principal staircase, of stone, 6 ft. wide, is situated at the rear of the hall; and the main

corridor, 9 ft. wide, starting from the entrance hall, forms the means of access to the rooms on the north and east sides, with a smaller, hexagonal hall, 20 ft. diameter, at the angle, and the students' staircase adjoining with side entrance from Blundell-street.

The library, which is entered from the entrance hall, has an extreme length of 72 ft. 6 in., with a width of 35 ft. 4 in., and a height of 18 ft., with a gallery of light construction carried round it at a height of 10 ft. from the floor. The students' common room, 40 ft. by 20 ft. 3 in.; the students' cloak room, 19 ft. by 15 ft.; the porters' room, and a lift for general purposes, also communicate with the entrance hall, and have a mezzanine stage used as a book store and as cloak room, and latrines for the professors. Access is obtained from the main east corridor at the upper level to the dean's office, 18 ft. 9 in. by 16 ft., with waiting-room; board room and professors' common room, 31 ft. by 18 ft.; general lecture theatre, 32 ft. 6 in. by 26 ft. 3 in.; diagram room, pathologists' private laboratory, 16 ft. 6 in. by 15 ft.; demonstrator's laboratory, 22 ft. 6 in. by 14 ft.; pathological histology laboratory, 43 ft. by 30 ft.; and laboratory for bacteriology, 16 ft. by 13 ft. 6 in.

Opening from the north corridor, and having windows overlooking Blundell-street, are the physico-chemical laboratory, 41 ft. by 31 ft. 3 in., with glass store, private laboratory, opening from same; and a lecture preparation room, 20 ft. 6 in. by 15 ft. 6 in., with additional gallery communicating with the former room by a staircase, and with the physical lecture theatre, a room 39 ft. by 26 ft. 3 in., and 18 ft. high.

On the first floor above these rooms, and with access from same by the private staircase, are the advanced students' room, 30 ft. by 26 ft. 3 in.; optical room; professors' room, 26 ft. 3 in. by 12 ft.; histology preparation room, 20 ft. by 12 ft.; and histological laboratory, 41 ft. by 31 ft. 3 in.

The anatomy department is situated adjoining, on the first floor, shut off by a screen and lobby, and contains a prosector's room, 30 ft. by 13 ft. 6 in., with additional space under staging of theatre. Lecture theatre 43 ft. by 30 ft., and 22 ft. high; large lift communicating with top floor, and also with mortuary, injecting room, macerating room, &c., in basement. Dissecting room, 80 ft. by 36 ft. 9 in., with north roof lighting, separate lavatory and locker room, and a gallery for the exhibition of diagrams, &c. A bone room with large gallery, and with separate entrance from main staircase, is also obtained over the entrance hall and porch; and the remainder of the anatomy department is obtained on the second floor, where the professor's private room is placed, as well as the curator's room, room for demonstrators, and work room.

The museum for pathological specimens is situated over the library. It is of the same size as that room, and also is fitted up with a light gallery. The chief lighting is obtained from the roof, which is opened timbered. The curator's workroom, assistant's workroom, photographic room, preparation room, &c., adjoin the museum, and are also reached from the first floor landing or the gallery of museum.

The students' lavatories and latrines, both for the first and ground floors, are arranged in one block, opening from the north corridor and projecting into the court-yard.

Many of the rooms and laboratories are to be fitted up with working-tables and benches, draught-closets, &c., specially designed by the architect from memoranda supplied by the various professors, and by Mr. Scattergood, the Dean of Medicine.

The contract for the general structural work is being executed by Messrs. W. Wilson & Sons, of Headingley, Leeds, at a cost of 25,060*l.*, and they are also executing the drainage work. The electric lighting is in the hands of Mr. T. Harding Churton, of Leeds.

The ventilation—to which a good deal of attention has been given—is by means of extract trunks, with upper and lower inlets from rooms. These are taken down to trunks below the basement floor, and the air is chimneyed up the ventilation shaft of the main chimney by means of a "Guibal" fan. The ventilation arrangements, and also the low pressure steam heating are being carried out by Messrs. F. Ashwell & Co.

J. W. Appleyard, of Leeds, is executing all the carved work, both in wood and stone.

The materials used are local facing bricks, running 11½ in. to the four courses, with dressings of Morley Moor stone. A good deal of glazed brickwork has been used, in the lavatories and latrines, and throughout in the dissecting-room and also as a dado to the principal corridors.

The floors of the principle upper rooms, and those of the lecture theatres of ground floor, are of fireproof concrete, and those most constantly in use will have wood block flooring.

The architect is Mr. W. H. Thorp, and the drawing from which the illustration is taken is exhibited at the Royal Academy.

HOUSES, BURNT ASH HILL.

THESE two houses have been built at Burnt Ash Hill, Lee. The woodwork throughout is stained dark brown, and oiled. The walls up to the first floor level are faced with red bricks, the walls to the upper floor being "rough-cast." The roofs are tiled. Messrs. Balaam Bros. were the contractors, and Mr. R. A. Briggs the architect.

HOUSE AT MAIDENHEAD.

THIS house has been built at Maidenhead with considerable alterations from the original design, of which this is a perspective, an entire floor having been added.

The roofs and walls to first floor are hung with tiles, and the walls to the ground floor are faced with red bricks. The woodwork throughout is painted white. Mr. Martin, of Boyne Hill, Maidenhead, was the builder, and Mr. R. A. Briggs the architect.

SCULPTURE.

THE figure called "A Scytheman," by Mr. E. Roscoe Mullins, is the principal work in sculpture in the New Gallery Exhibition; the figure of the "Girl Binding her Hair," by Mr. W. Goscombe John, we have already referred to as perhaps the best modelled full-length figure in the lecture-room.

Both works speak for themselves; they are perfectly unpretending in *motif*, and form good examples of the class of sculpture which derives its interest from the simple representation of life and action, apart from idealism.

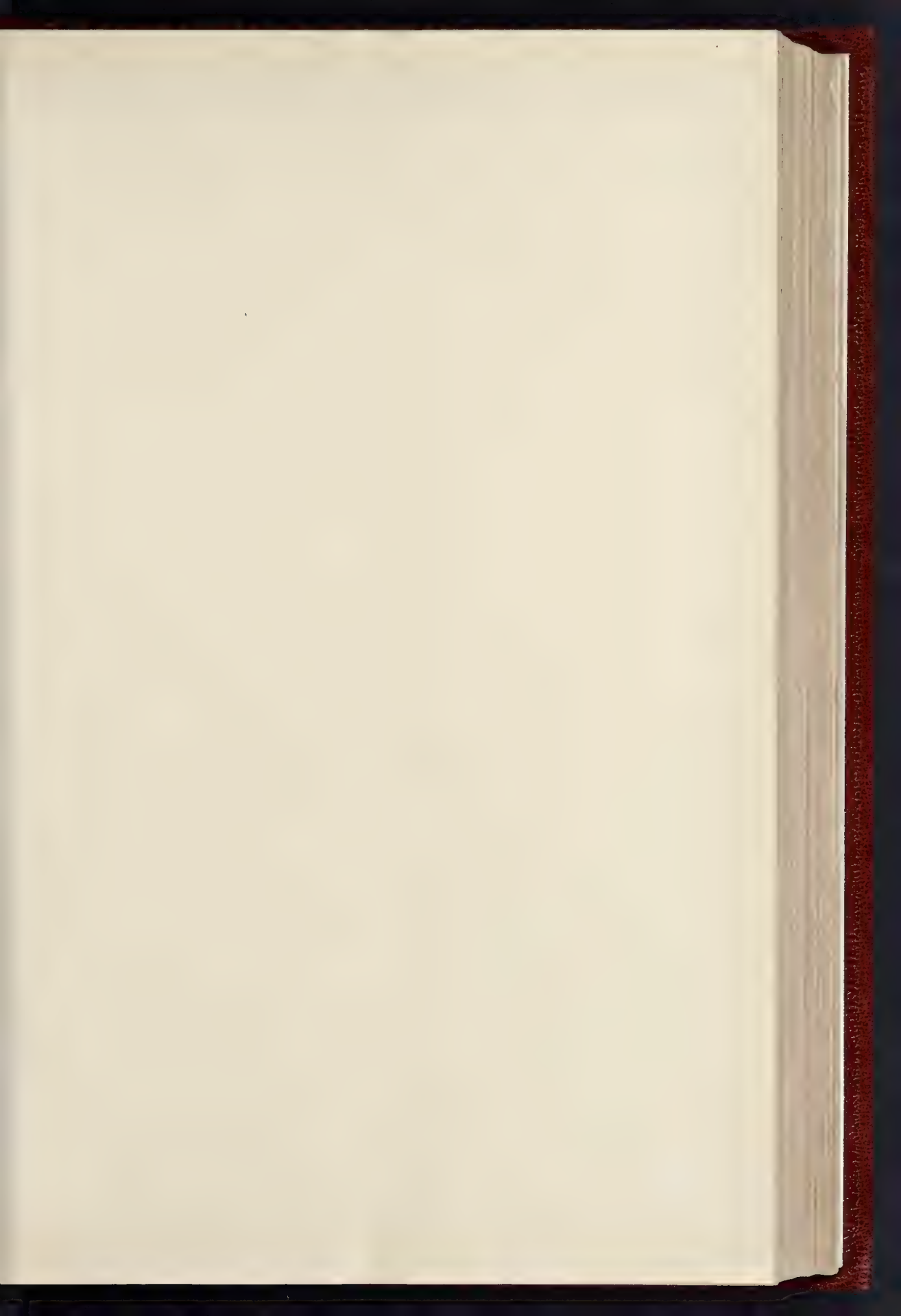
ARCHAEOLOGICAL SOCIETIES.

NEWCASTLE SOCIETY OF ANTIQUARIES.—A meeting of the Newcastle Society of Antiquaries was held on the 28th ult., in the Old Castle, Newcastle, Canon Greenwell presiding. Mr. Cadwallader J. Bates gave an account of some excavations recently carried out in connexion with Dr. Hodgkin's excavation found on a section of the vallum of the Roman wall near Heddon-on-the-Wall. The section was cut at the great hill about a quarter of a mile to the east of the village of Heddon. The excavation were made at the point where the wall makes a bend, where some years ago the late Mr. John Clayton had the wall excavated, and where he found a certain round opening in the centre of the wall. During the excavations a bronze axe-head and flint scraper were found. Votes of thanks were passed to gentlemen who had exhibited objects and had assisted in the excavations.

YARMOUTH ARCHAEOLOGISTS IN SUFFOLK.—A yarn of Yarmouth Archaeologists had a tour through a large part of Suffolk on the 22nd ult. Starting from the Southtown Station they proceeded to Halesworth, and from thence by coach to Little Linstead, Fressingfield, and Wingfield. A lengthened stay took place at Wingfield Castle, the ancient home of the family of De La Pole. Descriptive and historical papers were read at Wingfield and other places by Dr. Raven.

THE OXFORD ARCHITECTURAL AND HISTORICAL SOCIETY.—This society carried out their two days' programme to Gloucester, Deerhurst, Tewkesbury, Bredon, Pershore, and Evesham, on the 22nd and 23rd of last month, under the most favourable conditions. The president, Mr. Jas. Parker, acted as lecturer, and conducted the members over Gloucester Cathedral. Mr. R. K. W. Owen (St. John's College) arranged the excursion to the satisfaction of everyone.

PROPOSED ELECTRIC LIGHTING OF LANCASTER.—On the 28th ult., Major-General Crozier, R.E., held a Local Government Board inquiry into an application made by the Lancaster Town Council for sanction to borrow 25,000*l.*, the estimated cost of a system of electric lighting installation for the borough, to be provided by the Brush Electrical Engineering Company, of London. For the present the Corporation propose to light only the main streets in the centre of the town; but arrangements are being made so that additional plant may be put down as required.



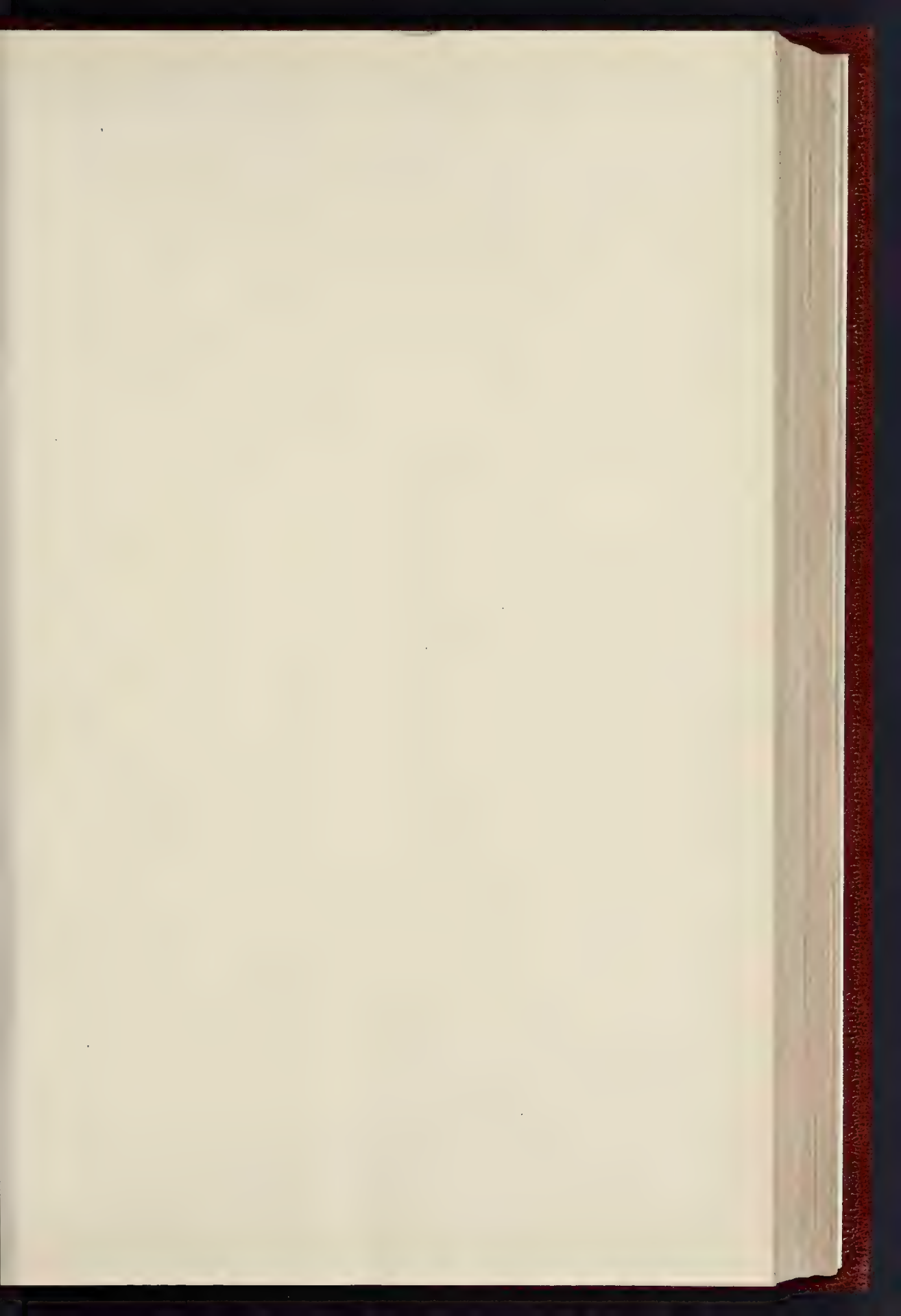


LEEDS SCHOOL OF MEDICINE, MOUNT PLEA



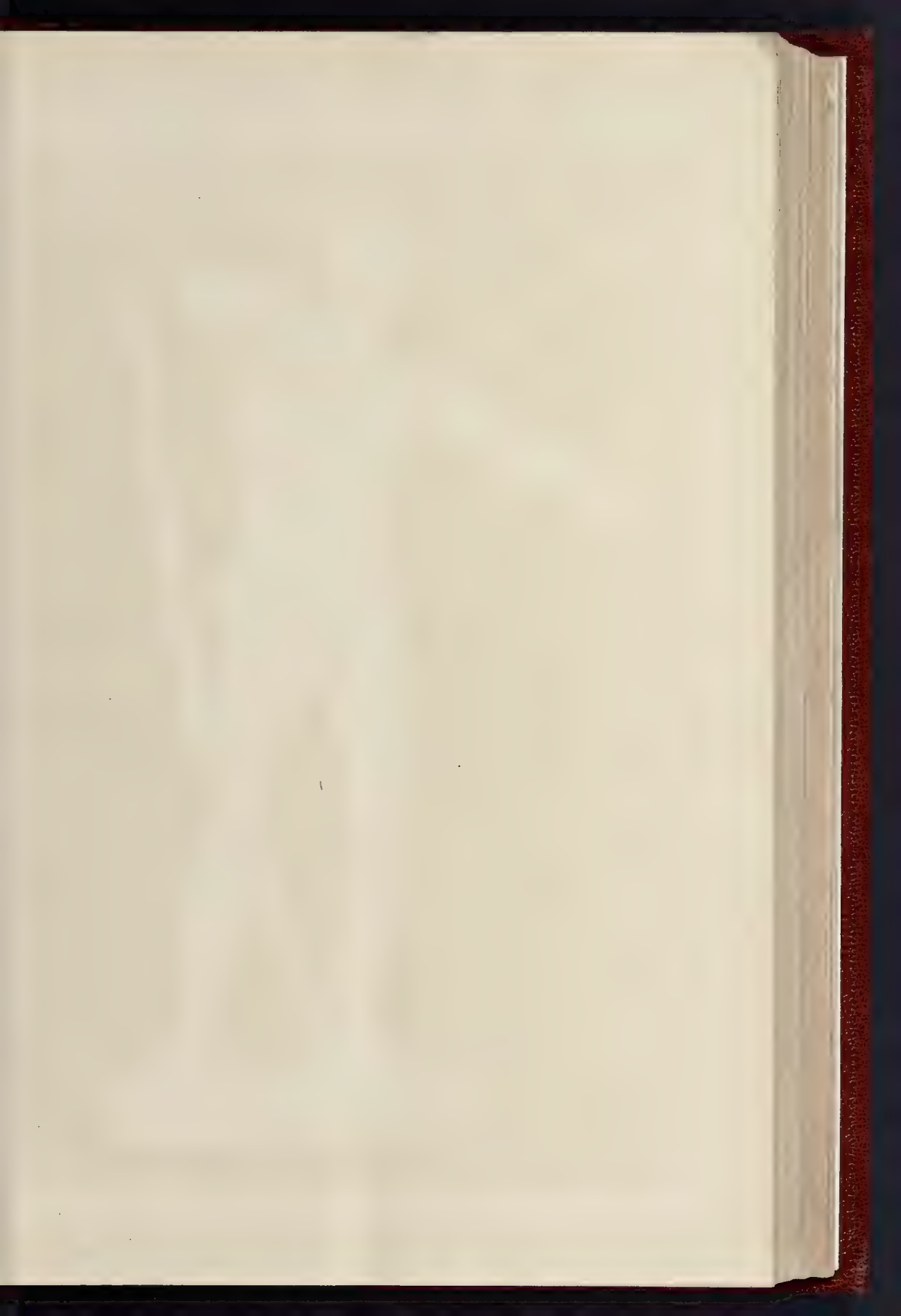
PHOTO LITHO SPRAGUE & CO. A.S. - EAST HARDING STREET FETTER LANE E.C.

DESIGNED BY MR. W. H. THORP, F.R.I.B.A., ARCHITECT

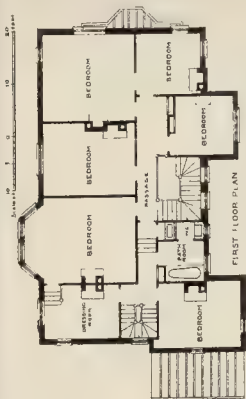
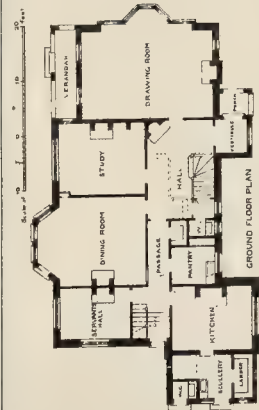




"A SCYTHEMAN."—MR. E. ROSCOE MULLINS, SCULPTOR.





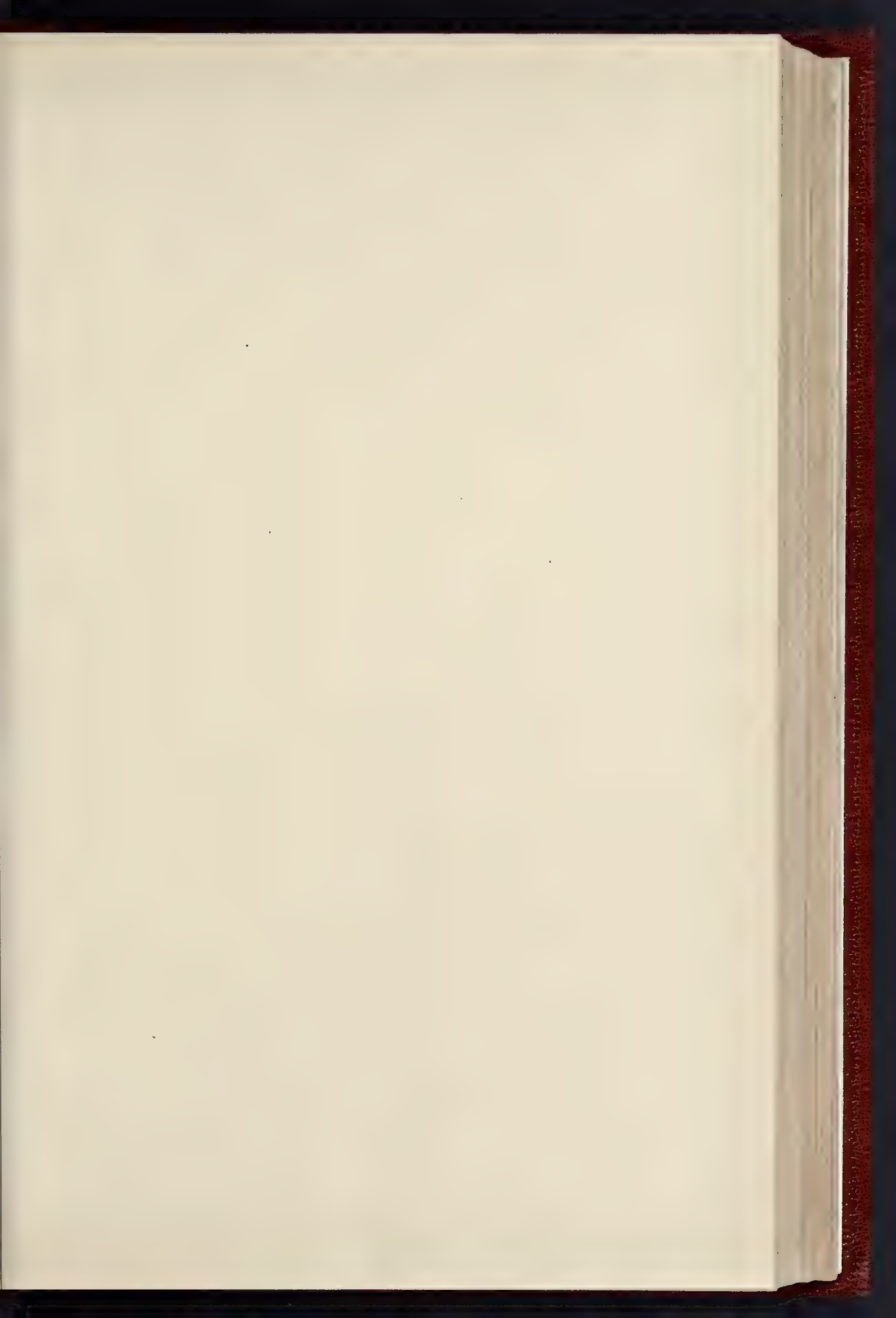


HOUSE AT MAIDENHEAD.—MR. R. A. BRIGGS, F.R.I.B.A. ARCHITECT



"GIRL BINDING HER HAIR."—MR. W. GOSCOMBE JOHN, SCULPTOR.

Royal Academy Exhibition, 1893.



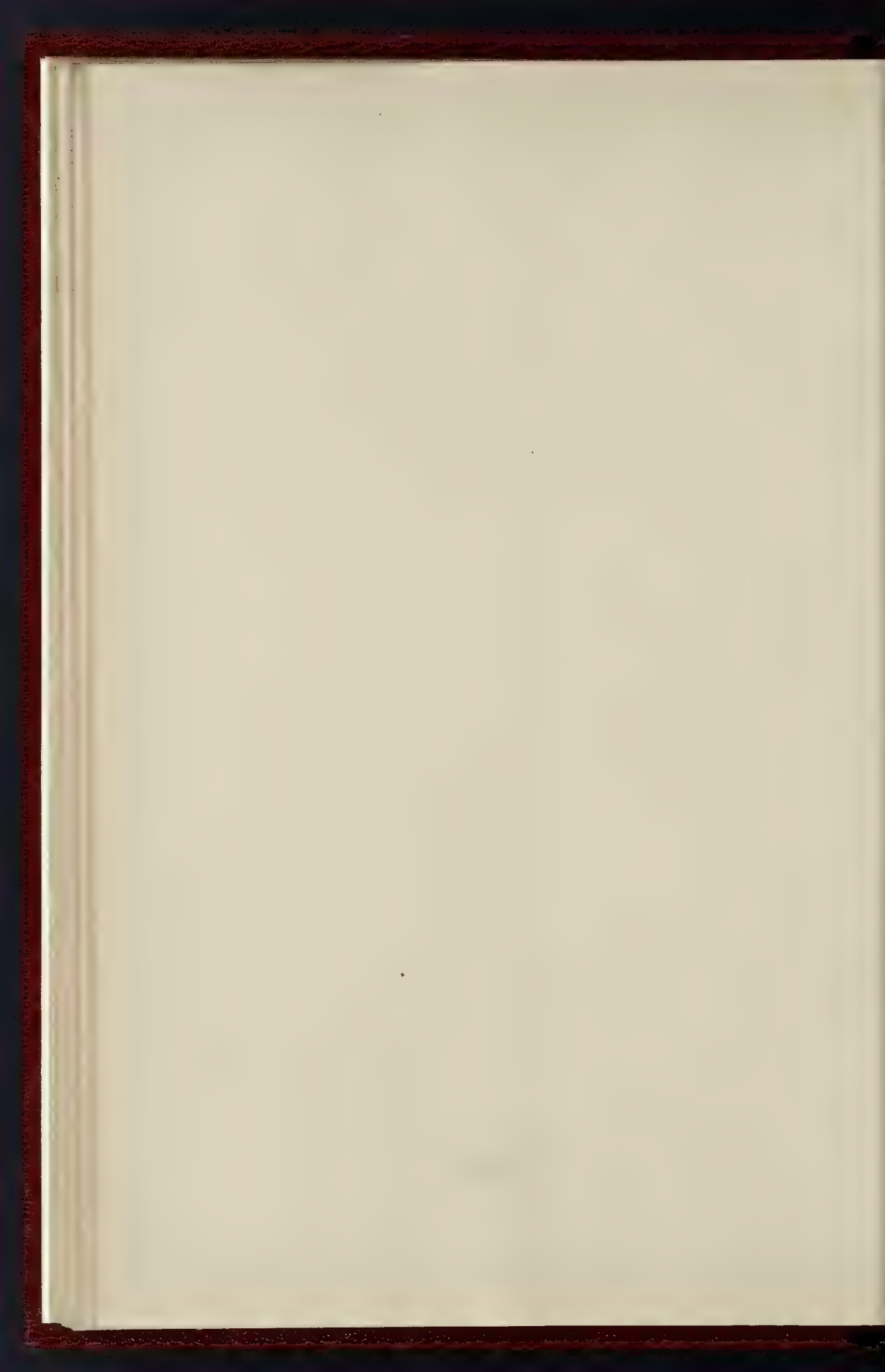


BATTERSEA TOWN HALL.—I



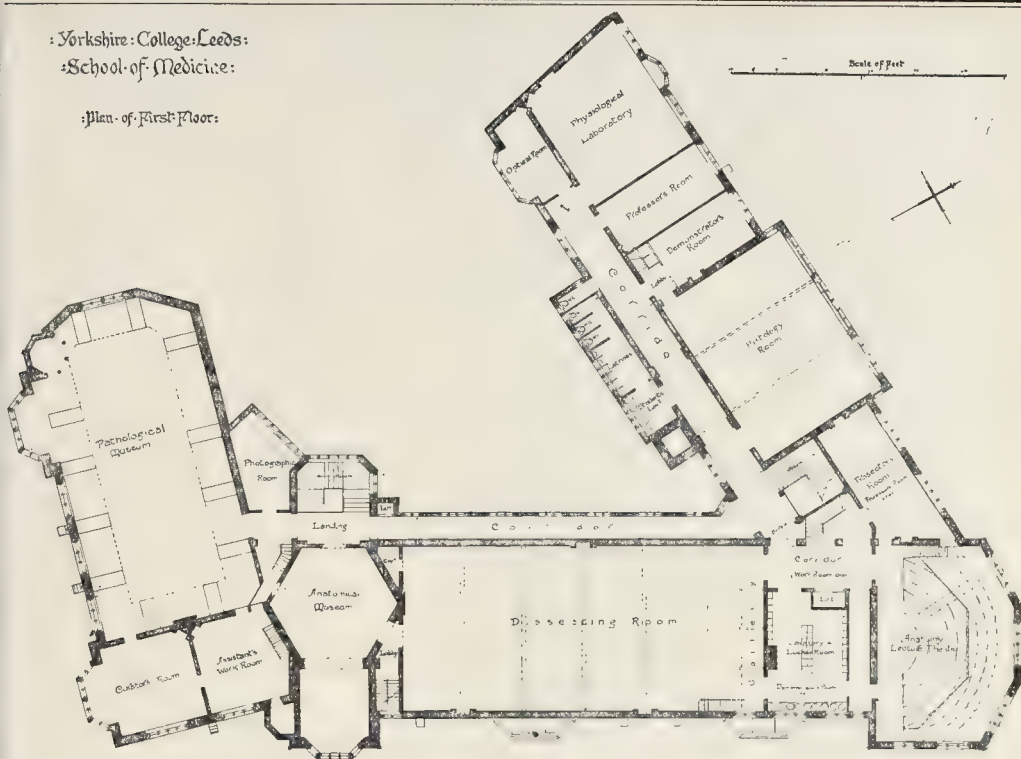
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MOUNTFORD, F R I B A, ARCHITECT



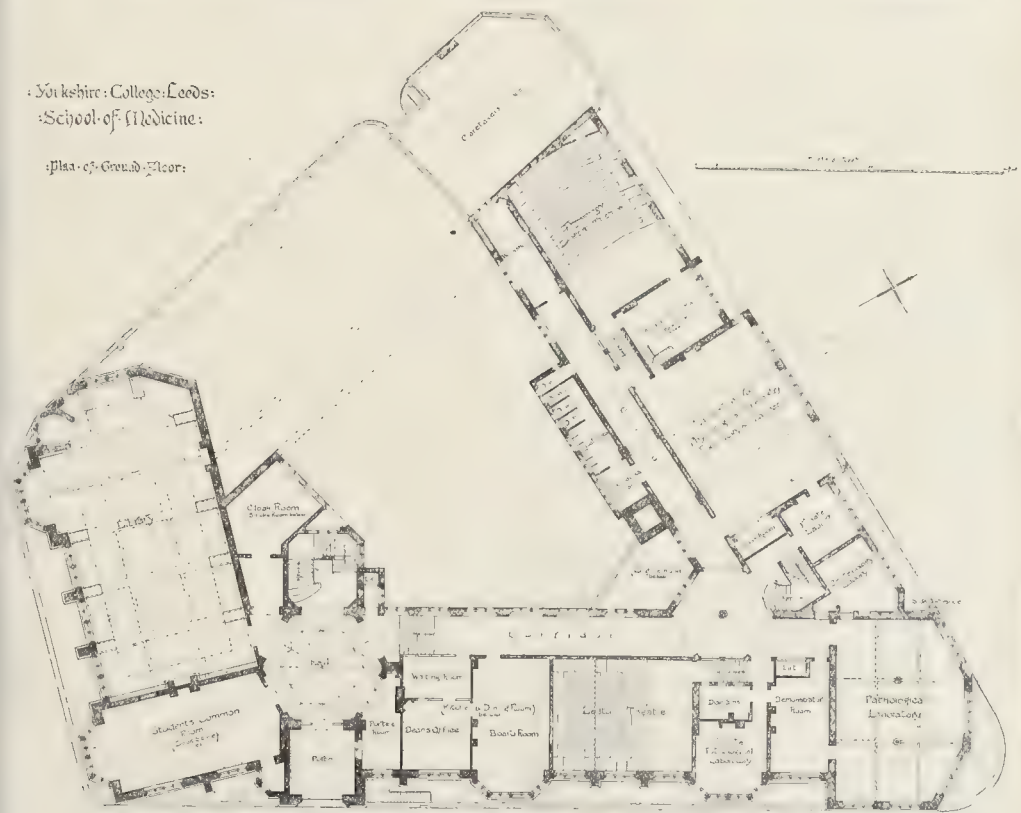
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Plans of Leeds School of Medicine—Mr. W. H. Thorp, Architect.

is not argument. I am well aware that waste pipes, as ordinarily fixed, soon become foul, but it is just this ordinary method of fixing to which I object. If any one that has read Mr. Buchan's letter will kindly turn back and read mine again, he will see where Mr. Buchan has gone astray. Mr. Buchan also thinks it is to doubt my veracity, such being the case, I must decline to have any further correspondence with him. BERNARD DICKSEE.

FILLING FOR JOINTS IN SHRUNKEN FLOORS.

SIR,—In reply to "Inquirer's" question [p. 15, ante] how to fill the joints of a shrunken floor which the owner will not allow to be taken up and relaid, and to which there is some objection to "slipping" with glued wood strips, I some few years since, under similar circumstances, made use of the following recipe in an old infirmary of a poor law school:—
"Thoroughly soak newspapers in a paste made of 1 lb. of flour, 3 quarts of water, and a tablespoonful of alum, thoroughly boiled and mixed; make the final mixture about as thick as putty, and it will harden like papier-mâché." In my case I think a little plaster of Paris was added, not to the bulk but to small quantities of the paper putty as it was used; the floor in the putty will prevent the plaster setting too rapidly. If I had time to experiment and opportunity to watch the result I should, in future cases, add a little weak glue or some knotting, or both.

The owner may be right, in "Inquirer's" case, in not having the floor-boards taken up and relaid, as this course might, unless the joints are unusually large and the ceiling under exceptionally good, result in damage to the latter. Another risk is, that unless special precautions are taken, the shrinkage after shooting the edges and relaying may be as bad or worse than before. To prevent this, rub in the newly shot edges of the boards hot size or weak glue to seal up the opened pores of the wood. Unless the floor is subject to much wear, why not veneer it over with batten widths specially cut thin (say 1 in. or 3/4 in. finished thickness) seasoned and dried after being prepared, or if narrower widths are desired, the same thickness could be fluted out of planks or 4 in. deals?

I have heard of caulking with whitelead and tow, which, I suppose, is what is done on the decks of yachts, but I have not actually seen such caulking in buildings. I have not had the opportunity of seeing the result of wear and time on the paper putty but if "Inquirer" will send me his address, I shall be pleased to direct him to the building so that he may examine the work for himself.

ARTHUR HARSTON.

SIR,—Some time ago I successfully filled similar openings with a mixture of thin glue and sawdust; but it struck me afterwards that paste and sawdust would have done equally well.

The glue mixture requires keeping hot and rubbing into the open joints with the fingers, and wiping off as you go along.

I have heard that paper putty or pulp, made by soaking newspaper in paste, answers well.

C. F. M.

The Student's Column.

GEOLOGY II.

THE EARLY STAGES OF THE EARTH.

WHEN we look up to the sky on a clear night we observe a cloudy streak running over a part of it, which is popularly known as the "milky way." Astronomers have discovered several other masses of a similar kind, which are all called *nebulae*. These nebulae have been requisitioned to assist in framing a hypothesis accounting for the original formation of the various planets of the solar system—the earth, of course, included. According to this hypothesis, nebulous matter, which once reached to the uttermost confines of the system, commenced to condense at its central part, and in so doing left behind successive rings which subsequently assumed the form of planets, sometimes with a further formation of rings, which, in the case of Saturn remain, though in other planets they have become detached, and form satellites. Thus, the moon was detached from the earth. It is no part of our function to show in what way this hypothesis is substantiated by observed facts; the reader can ascertain that on reference to any text-book bearing on the subject. Suffice it to say that we may fairly assume that the condensation was accompanied by cooling, and the earth gradually consolidated, whilst in the hollows of its rugged exterior, water, derived from vapour, at length collected in great quantity. At that time the surface of the earth, both land and water, was warm, and during the process of cooling of the

heated mass within, must have been subjected to considerable disturbance. Subsequently the crust hardened and became more rigid and stable, and both land and water were cooler.

THE ORIGIN OF ROCKS.

Then the rocks composing the crust having been consolidated from molten matter were entirely igneous in character. These must have been attacked, as soon as possible, by the water, and denudation or wasting away of the land thus began. The materials so derived subsided to the bottom of the water, and aqueous rocks in this manner were for the first time deposited on the sea floor. Meanwhile, the water having become inhabited with organisms of various kinds, these on dying were entombed in the great thickness of aqueous rocks, and formed "fossils." But the crust, although to a certain extent rigid, was still subjected to disturbances from within and without, acting either suddenly, or throughout long periods, producing great cumulative effects, and the sea-floor and dry land changed places several times under these peculiar conditions. One of the accompanying results of these earth movements was the development of enormous pressure, which, by the aid of Nature's chemical laboratory, completely changed the character of those parts of the igneous and aqueous rocks subjected to such pressure; the superincumbent weight of the rocks also, by an analogous process, tended to materially alter the nature of those portions of themselves which were situated at some depth. A very elementary study of physics would convince the student of the reasonableness of this part of the hypothesis.

Thus three distinct classes of rocks were formed (1) the *igneous*, from consolidated molten matter; (2) the *aqueous*, laid down in water; and (3) the *metamorphic*, consisting of either of the foregoing, materially altered in character. And these three classes are, in fact, the same as we find on the surface of the earth at the present day; the only other kind discovered being (4) the *aeolian*, loose material, blown into favourable spots by the action of the wind, and there accumulated. These latter do not constitute a very appreciable proportion of the whole.

It is extremely doubtful whether any of the rocks now found formed part of the original crust of the earth. The agents of denudation, with their unceasing action, have had a practically unlimited time in which to ply their avocation, and they have accomplished their work with energy and persistency, so it is more than probable that the original crust was long since worn away, the materials having been made use of in newer formed strata. Certain it is that we have abundant evidence of the metamorphism of enormous thicknesses of what must originally have been more ancient aqueous rocks than any of which we have now any certain knowledge. In other words, beneath the oldest of the recognised aqueous rocks we find more ancient metamorphic rocks which were originally aqueous.

Paraphrasing it may be observed that as these latter must, in the ordinary course of events, have contained the remains of the most ancient forms of life, and these by metamorphism were obliterated, we stand no chance whatever of being able to ascertain the nature of the prototypes of life—a sad circumstance for the paleontologist. The acknowledged oldest aqueous rocks in this country, however, have yielded an abundant fossil fauna, which includes some of the highest types of invertebrate animals; it is certain, therefore, that life must have begun long anterior to their deposition. We know that it had already become highly specialised—for invertebrates—before those rocks were in existence.

THE AQUEOUS ROCKS.

Now, the aqueous rocks are of immense thickness—several miles—and if we attentively examine their fossil contents we find, commencing at the lowest zone with the oldest known and extinct forms of life, that fauna after fauna succeeded one another, each one being different to its predecessor, until we arrive at the uppermost portion of the whole succession of rocks, where we discover that the entombed remains are of the same species as animals now in existence. The lapse of time between the deposition of the oldest aqueous rocks, and the newest, must have been enormous to have permitted so many and such vast changes in the different faunas, in the interval. At certain horizons we mark the incoming of fish, amphibians, reptiles, mammals and birds respectively; we observe that whole orders of beings came upon the earth, with their genera and species, which after performing their rôle died

out, and were replaced by other new orders, which in turn became extinct also—a process continually repeated until the present phase of life came into existence. Each group, or facies, of life, having naturally been confined to the strata laid down at the time of its existence, the student will readily perceive that it is convenient to give each portion, or horizon of the strata thus characterised, a definite name so as to be able to refer to it readily; the following are the names adopted for the chief divisions, or horizons, of the aqueous rocks in this country:—

Divisions of the Aqueous Rocks.

Cainozoic or Tertiary.	Pleistocene.	Drift deposits. Glacial beds. Norwich crag. Red crag.
	Pliocene.	Coralline crag. Osborne ledge. Heaton beds. Barton beds.
	Miocene.	Hamstead beds.
	Oligocene.	Bembridge beds.
	Eocene.	London clay. Woolwich and Reading beds. Thanet beds. Chalk.
	Cretaceous.	Upper Greensand. Gault. Lower Greensand. Wealden beds.
		Purbeckian. Portlandian. Kimmeridgian.
		Corallian.
		Oxfordian.
Mesozoic or Secondary.	Jurassic.	Great Oolite. Fullers Earth. Inferior Oolite. Lias.
		Rhaetic beds. Saurer beds. Bunter beds.
	Triassic.	Upper Red Sandstone. Magnesian Limestone. Lower Red Sandstone. Coal measures.
	Permian.	Millstone Grit. Carboniferous Limestone.
	Carboniferous.	Limestones and Sandstones.
	Devonian and Old Red Sandstone.	Ludlow group. Wenlock group. Llandovery group. Caradoc or Bala group. Llandovery group. Arenig group. Tremadoc Slates. Dolgelly group. Menai group.
Paleozoic or Primary.	Silurian.	Harlech and Llangynydd groups.

In the above table the oldest aqueous rock is placed at the bottom and the newest at the top.

OBITUARY.

MR. HENRY GILL, the head of the Berlin Municipal Waterworks, died last week at the age of seventy. Mr. Gill first visited Berlin in 1853 on behalf of an English company which was constructing some waterworks in the suburb of Stralau. He afterwards acted as engineer-in-chief for this company until 1874, when the Municipality took over the whole concern, and gave him the entire management of it. Mr. Gill's skill has been much appreciated both by the technical world and the Municipality he worked for until a few weeks back. His death is considered a great loss throughout Germany. He was for many years a popular figure both at professional and social gatherings.

HERR ALEXANDER STUDE, the Chief Officer of the Berlin Royal Police Fire Brigade, died suddenly last week while doing duty as a captain in the Prussian Army Reserves. His age was forty-five. He had originally been educated for the architectural profession, but after having served in the Franco-German War (in which he won the Prussian Iron Cross) he entered the fire service. Prior to being appointed chief officer in Berlin in 1887, he had commanded the Bremen force. Nearly all the important Government fire, police, and building regulations of the last decade were framed in accordance with his ideas, notably the important theatre regulations of 1880 and the Berlin "Suburban" regulations of last year. He was as well known for his rational preventive measures against outbreaks of fire as for his gift of organisation of brigades, and his skilful tactics when attending conflagrations. He was esteemed as highly by the Emperor, Government, and Municipal authorities as he was popular with his subordinates and the inhabitants of Berlin. The public funeral accorded him was most imposing. The military authorities lost in him an expert on army clothing, the electricians a savant on lightning, and the architectural profession a specialist in iron construction.

THE BRITISH METAL EXPANSION CO., LIMITED, announce that they have removed from Billiter Avenue, and opened a show-room and warehouse at 3, Lambeth-hill, Queen Victoria-street.

GENERAL BUILDING NEWS.

PROPOSED SCHOOLS, STONE.—We are informed that the Stone School Board have selected the plans of Mr. J. T. Walford, of Northfleet, for the new schools to be built at Stone and Beam. Nine designs were sent in in competition for these schools.

BATHS, WOOLTON.—On the 28th ult. new baths were opened at Woolton, near Liverpool, and presented to the inhabitants by Mr. Holbrook Gaskell, J.P. The baths occupy a site at the junction of Allerton-road and Quarry-street, and the style of architecture is Italian. The offices occupy the angle of the two roads, and are faced in red Woolton stone. The exterior of the swimming bath and private bath of red terra cotta bricks relieved by stone dressings. There are six private bath-rooms fitted up with glazed earthenware baths, &c. At the end of the entrance passage is placed the swimming bath, 60 ft. long by 25 ft. wide, lined with white glazed tiles with ornamental border. An earthenware foot-bath with shower is formed in an angle recess. Along one side is a range of eighteen dressing-boxes, and over the entrance end is a gallery. This bath has the bottom, walls, and gangways, formed in cement concrete. At the far end is formed a large doorway, with folding doors opening outwards, to serve as a speedy and safe exit in case of panic, since it is intended that the building, with the swimming bath boarded over, shall be used for lectures, entertainments, &c. The bath is lighted by a large skylight. At the side of the bath in the rear are placed the laundry and boiler houses, fitted up with the latest appliances. The contractor is Mr. Dilworth, of Wavertree, and the engineering work has been done by Messrs. Thos. Bradford & Co., of Manchester and Salford. The total cost has been about 3,000l. The whole of the work has been carried out from the plans prepared by, and under the immediate superintendence of, Messrs. Horton & Briggford, architects and surveyors, of Manchester.

CHURCH, HEAVILEY, STOCKPORT.—The foundation-stone of St. George's Church at Heaviley, Stockport, was laid on the 17th ult. The new church occupies a site in a locality where the population is rapidly increasing, and it will have a spire rising to a height of 230 ft. Messrs. Paley, Austin, & Paley, of Lancaster, are the architects, and the masons' work is being carried out by Messrs. W. Thornton & Sons, of Liverpool. Messrs. Hatch & Sons, of Lancaster, are entrusted with the woodwork.

PARISH CHURCH, MALONE, NEAR BELFAST.—The foundation-stone of a new parish church was laid at Malone a short time since. The new church is situated at the junction of Osborne Park and Malenore-road. It is being built in the Gothic style of the early English period. The church is being built of rubble work, faced with Scrabo shuddies, and with dressings in red stone from the Dunfries quarries. The internal walls are being lined with red bricks from the Annadale Works. The church is cruciform in plan, the axis being placed due eastward and west, and a tower rises from the north-east corner. The chancel, transepts, and organ chamber, will be separated from the nave by cut stone arches carried on moulded piers. The roof will be of selected pitch-pine, open to the ridge. The present scheme includes an outlay of upwards of 4,000l., which will complete the chancel, the transepts, part of the nave, and the tower, and will seat about 450 people; when the nave is completed it will seat about 220 sittings, and it is calculated that 2,500l. additional will entirely finish the building. The work is being carried out by Messrs. W. J. Campbell & Son, late Dixon & Campbell, from the plans and under the superintendence of Mr. Henry Seaver, architect, of Belfast.

BUILDING IN LEIPS.—Mr. Davidson H. Linworth, Building Inspector to the Leeds Corporation, has just issued his report for the year ending March 25. The 2,527 houses shown upon the 447 plans approved by the Building Clauses Committee, during the year, included 19 villas, 36 semi-detached villas, 824 through houses, and 1,618 back-to-back houses. The 30 miscellaneous plans were for one addition to church, two chapels, two additions to chapels, one convent, two schools, 18 additions to schools, one orphanage, two hotels (rebuilding), and one extension of hotel. During the year, 1,915 houses have been completed and certified for occupation, including 6 villas, 19 semi-detached villas, 632 through houses, and 1,258 back-to-back houses. During the same period, 768 miscellaneous buildings have been completed and certified, amongst which were one addition to church, one chapel, four additions to chapels, two mission rooms, one addition to mission room, four schools, eleven additions to schools, one extension, Leeds General Infirmary, one Yorkshire College Hall of residence, one Oddfellows' Hall (Kingston Unity), and one bank, &c.

"OLYMPIA," NEWCASTLE-ON-TYNE.—A building, which will be known as "Olympia," is being erected at Newcastle, and will be capable of seating about 5,000 people. The building is proposed to be constructed with framework of cast and wrought iron and covered with corrugated iron, riveted and bolted, the pillars and standards to be supported on beds of concrete. The floor will be covered with r.i.n. grooved and tongued boards. All the doors of the

place will be made to open outwards. The building will be lighted by gas and electric light. The main entrance, which will be in Northumberland-road, will be 20 ft. wide, and will lead into a vestibule in which will be cloak-rooms, pay-box, and other accommodation. From this vestibule, and on the same level, access will be gained to the body of the hall, which will be divided from the vestibule by three sets of swing doors. Access to the gallery will be obtained by two staircases. The stage will be 52 ft. by 25 ft. wide. In connection with the stage, there will be dressing, green, retiring, and band rooms. Below the stage there will be six dressing-rooms and other apartments which will be approached by separate entrances at the rear of the building. The gallery will run round three sides of the building, and will be 12 ft. 6 in. wide. At the end of the gallery there will be a lounge, and in the body of the hall there will be four swing doors to be used as extra exits, in addition to the ordinary doors. The size of the hall will be 135 ft. long, 78 ft. wide, and 50 ft. high. The gallery and roof of the hall will be supported by ornamental iron columns. The roof will be of iron, and the lighting of the body of the hall will be obtained by a range of lights running along both sides of the building. Messrs. Oliver & Leeson, of Newcastle, are the architects.

SCHOOLS, ST. HELENS, LANCASHIRE.—At the meeting of the St. Helens Health Committee on the 28th ult. Messrs. Wilson & Toft, architects, of Liverpool, submitted plans for the erection of new day and Sunday schools and mission-room on land at the corner of Wolsley-street and Keswick-street, Cowley Hill. The new building will consist of two stories, 17 ft. 6 in. and 15 ft. respectively. The first floor will be for girls, and the ground floor for boys. There will be two rooms to accommodate 140 scholars each, four classrooms for 80 each, and four for 50 each, with lobbies and lavatories on each floor. The ground floor will also be used as a mission church, and will take the place of York-street mission-room. A chancel is included in the scheme, as a memorial to the late Rev. A. H. Wolsleyholme, and it will be shut off from the school by folding doors. The total cost is estimated to be nearly 8,000l.

SCHOOLS, MOSS SIDE, LANCASHIRE.—The memorial stone of St. James's Schools, Moss Side, was laid on the 1st inst. The schools are situated at the junction of Barton-street and Great Western-street. They are one story high, and consist of a central hall 60 ft. by 30 ft. with an opened timbered roof 25 ft. to the ceiling. On the north and south sides, divided by glazed screens from the main hall, are six class-rooms, each 15 ft. by 12 ft., and at the east end is the kitchen and retiring-room, with separate entrances. The parish-room is at the west end, near the two principal entrances from Barton-street. The contractors for the building are Messrs. F. & E. Haynes, of Moss Side, and the outlay will be 1,250l., in addition to the cost of the concrete roofs. The architect is Mr. John Lowe, of Manchester.

SCHOOL EXTENSION, HARPUREY, MANCHESTER.—The memorial stone of the infant department of the Burgess-street Board School, Harpurhey, was laid by Dr. R. C. Smith, on the 1st inst. The building will be of brick and terra-cotta, and will comprise one large room and a range of four class-rooms capable of being thrown into one. The architects are Messrs. Preston & Vaughan, and the builders, Messrs. Wilson & Toft. The new department will accommodate 500 children; the estimated cost of the extension, including the site, being 4,500l.

WESLEYAN CHAPEL, EAST MARKHAM, NOTTINGHAMSHIRE.—The foundation-stones of a new Wesleyan Chapel for East Markham, about six miles from Retford, were laid on the 28th ult. Mr. Theophilus Wilson, builder and contractor, of East Markham, made the authorities a present of the site. The architect is Mr. John Allsopp, of Worksop. The style will be Gothic, the accommodation for 200 persons, and the cost 700l.

POST OFFICE EXTENSIONS IN SHEFFIELD.—On the 3rd inst. the new premises erected by the Post Office authorities in Flat-street, Sheffield, were opened to the employees engaged in the sorting and despatch of letters and parcels. So far as the public are concerned, the new offices will replace the temporary building in Commercial-street, which has been used as a parcels post office. The new building has been built by Mr. S. Warburton, of Manchester, from designs made by Mr. A. Tanner, of the Works Department.

CHURCH, CUDWORTH, YORKSHIRE.—The Archbishop of York consecrated a new church at Cudworth on the 29th ult. It is to be called St. John the Baptist, and has been erected at a cost of about 2,600l., to seat 238 worshippers. It is from the designs of Messrs. Smith & Brodick, of Hull, and is in the Early Decorated style. Messrs. B. Graham & Sons, Huddersfield, have been the contractors.

RENOUVIS HOTEL, FALMOUTH.—A new hotel has just been erected on a site adjoining Falmouth beach. The hotel faces almost due south. The main entrance has a vestibule and double screen doors. The coffee-room on the ground floor is situated at the western end of the building, and in length is 41 ft. with a breadth of 21 ft., exclusive of the

bays. Adjoining, and at right-angles, is an annexed coffee-room, 30 ft. by 16 ft. The entrance hall is between the vestibule and the reading-room, which also faces the sea. The reading-room communicates with a drawing-room. Adjoining the drawing-room at the end of the long corridor facing the south-east is a bijou smoking-room, and on the opposite side of the corridor is a billiard-room. The first floor contains a large number of bedrooms and two sitting-rooms. At each end of the corridor there is a bath-room. On the first floor there is also a warming apparatus to ensure the proper airing of bedding. The second and upper floor consists entirely of bedrooms. The style of architecture is the Queen Anne. The building has been erected by Messrs. James Julian & Co., of Truro, from the designs of Mr. S. Trevel, of Truro. The total of the freehold, building, and furniture has amounted to about 10,000l.

PROPOSED PUBLIC OFFICES AT OTLEY.—On the 30th ult. Mr. Rienzi Walton, M.Inst.C.E., Local Government Board Inspector, at the Local Board-room, Otley, held an inquiry into the application by the Local Board for sanction to borrow 2,500l. for the purchase of land and the erection thereon of public offices, 645l. for the purchase of a steam fire-engine and steam road-roller, and 350l. for the provision of a disinfecter and mortuary.

NAVY, ST. GWLADYS CHURCH, BARROED, MONMOUTHSHIRE.—On the 29th ult. the foundation stone was laid of the nave of the St. Gwladys Church, Barroed. The old nave, which was of iron, was built in 1876, and the chancel a few years later, at a cost of 1,300l. The church as it now stands, with the addition of the new nave, will seat about 350 persons. The contractors are Messrs. W. Williams & Sons, and the architect is Mr. E. M. Bruce Vaughan, Cardiff.

SANITARY AND ENGINEERING NEWS.

THE INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.—The annual meeting of this Association is to be held in West Bromwich, on Thursday, Friday, and Saturday, July 23, 24, and 25. A very good programme has been arranged, under the direction of Mr. J. T. Eayrs, Borough Engineer and Surveyor of West Bromwich, who is the new President of the Association.

STAINED GLASS AND DECORATION.

WINDOW, MANEA, CAMBS.—The east window of the parish church of Manea, Cambs., has just been filled with stained glass, the gift of Miss Green, of Manea, in memory of her father. The subject represented is the Ascension. The work has been carried out by Messrs. Mayer & Co.

WINDOW, PARISH CHURCH, LEIGH (Lancs.).—The west window of the parish church of Leigh has been filled with stained glass to the memory of the Rev. the Bishop King (brother of the Bishop of Lincoln), late rector of the parish. The window was erected by subscriptions among parishioners and friends, and was dedicated on the 29th ult. It was designed and executed by Messrs. Percy Bacon & Brothers, of London.

FOREIGN AND COLONIAL.

FRANCE.—It is announced definitely that M. Saglio has been appointed curator of the Cluny Museum; his duties will be divided with M. Molinier as curator of *objets d'art*, and M. Courajod for sculpture. The health of the eminent sculptor, Dalou, which was causing some anxiety, is now much amended.—On Thursday last, the monument to M. Fustel de Coulanges was inaugurated in the Salle des "Actes" in the Ecole Normale. The monument consists of a marble bust by M. Pierre Ogé, placed on a pedestal designed by M. Mayeux, professor at the Ecole des Beaux-Arts, architect of the Ecole Normale.—The Municipal Council of Paris has decided that the monument erected to the memory of the celebrated sculptor Barye shall be placed at the point of the Ile Sainte Louis, before the Hotel Lambert, and near the pont Sully.—M. Antonin Mercier has just finished the model of the monument to the memory of Jules Ferry, which is to be erected on the place de Saint Die (Vosges). The sculptor has made him standing with his hands behind his back, a very favorable attitude, with him.—The Prefet de la Seine has just inaugurated at Chatillon the monument to the memory of the soldiers killed in 1870, at the battle which took place near there.—Mr. J. B. Martenot, architect of the town and of the hospitals of Rennes has been chosen officer of Public Instruction, M. Alfred Beau, painter, Director of the Musée de Guimpeur, has received the Cross of the Legion of Honour. M. Benu has made an important ethnographic and ceramic collection.—The jury appointed to judge the open competition for the erection of a monument to the memory of Doudart de Lagree, has reserved the first prize to the designs of MM. Jay, Rambaud and Portal, Resnais, and Rubin, for the second competition.—The first prize for the competition for a monument, which is to be erected at Valance (Drôme) to the memory of Emile Augier, has been awarded to Madame la Duchesse d'Uzès.—The Minister of Public Works has just inaugurated the new lines between Lagnac and

Mauriac, and Brive and Limoges. These new routes will considerably shorten the journeys from Paris to Aurillac, and from Paris to Toulouse. This last line passes through a very hilly country, and has necessitated some very important work; it has cost 450,000 fr. per kilometre. — A new railway line has also been opened from Rozoy-sur-Seine to Liart, which unites the "Nord" railway system with that of the "Est." — The Council of the "Nord" railway company have adopted, in principle, a scheme for subterranean railway routes uniting the Gare du Nord with the Halles Centrales and the Place de l'Opéra. This latter branch will have its terminus at the Boulevard, and the access to the railway will be at the ground-floor of the Grand Hôtel. — All our readers will be glad to hear that Mr. Charles Garnier, who has suffered for some time under a painful local ailment, has undergone a successful operation, the result of which will probably lead to the speedy recovery of his health. — The death is announced of Mr. Jules Doupouy, architect to the Comte de Montale-Marsan, the age of thirty. — A painter who has long been lost sight of, Mr. Benedict Masson, a pupil of Delacroix, has just died at the age of seventy-six. He executed the large frescoes which decorate the Cour d'Honneur of the Hôtel des Invalides.

MUNICH. — The annual International Art Exhibition was opened on July 1 with much ceremony at the Crystal Palace. The exhibition is considered to be an exceptionally interesting one, and superior to this year's exhibition at Berlin. Among the English exhibits are some by Mr. Alma Tadema, and a special collection of Mr. Watts' paintings. Belgium, the Netherlands, and the United States are well represented.

MISCELLANEOUS.

THE SURVEYORS' INSTITUTION SPECIAL CERTIFICATE EXAMINATIONS, 1893. — The following candidates are declared by the Examiners to have passed the Special Certificate Examination in Forestry, held on the 13th, 14th and 15th ult., viz.—Burnett, George John Mulcaster, of Bylands, Redbourn, Herts; George John, of Hope End Estate Office, Ledbury, Herefordshire; Martin, Thomas, of North Place, Redbourn, Herts; and Maughan, John, of the Estate Office, Jervaulx Abbey, Bedale, Yorkshire.

KIRKSTALL ABBEY. — The *Athenaeum* states that the Leeds Corporation have resolved, under the advice of Mr. J. T. Micklethwait, architect, who has signed an inquiry at Darlington Town Hall on the 29th ult. in regard to proposals to borrow money for public and private improvements aggregating an amount of 10,798l. It is proposed to build a new bridge at the bottom of Tubwell-road, and widen the thoroughfare contiguous to St. Cuthbert's Church, which will be opened out by the removal of property.

PUBLIC IMPROVEMENTS AT DARLINGTON. — Mr. R. Walton, C.E., Local Government Inspector, has signed an inquiry at Darlington Town Hall on the 29th ult. in regard to proposals to borrow money for public and private improvements aggregating an amount of 10,798l. It is proposed to build a new bridge at the bottom of Tubwell-road, and widen the thoroughfare contiguous to St. Cuthbert's Church, which will be opened out by the removal of property.

PUBLIC WORKS, WEST HARTLEPOOL. — On the 28th ult. Mr. Rienzi Walton, M.Inst.C.E., acting on behalf of the Local Government Board, concluded an enquiry respecting the application of the Corporation to borrow 1,634l. for market, and 1,664l. for street improvement purposes.

EXCURSION OF CARDIFF MASTER BUILDERS. — The first annual excursion in connection with the Cardiff Master Builders' Association took place at Chepstow and the Wye Valley on the 1st inst. The party inspected the castle, and subsequently left Dell-road by brake for Tintern, taking Wyndcliff en route, returning afterwards to Chepstow, where dinner was served at the Beaufort Arms Hotel. Cardiff was reached shortly after nine o'clock.

PRESENTATION TO MR. JOHN DAVIS. — At Beale's Restaurant, Holloway-road, on Tuesday evening, a complimentary dinner was given to Mr. John Davis "to celebrate the victory obtained over the Hornsey Local Board re Wightman-road (4th section)." Mr. A. Morton, President of the Association of Master Builders of Hornsey, presided, and Mr. C. Peek occupied the vice-chair. During the evening Mr. Davis was the recipient of an illuminated address and a gold watch. The address was as follows:—"To Mr. John Davis. The Association of Master Builders of Hornsey and friends have great pleasure in presenting to you this testimonial, with the accompanying gold watch, in recognition of the very great service you have rendered to owners of property and others in contesting the action brought by the Hornsey Local Board to recover the cost of re-surfacing the fourth section of Wightman-road. The action was recognised as being of the

greatest importance, as its success would have imposed a heavy burden upon owners in the future in respect of similar work. We, the undersigned, beg to put on record our full appreciation of the splendid public spirit which prompted you in so successfully contesting the action which was carried up to the Court of Appeal (8th March, 1893), before it was abandoned by the Hornsey Local Board." [Here followed the names of the subscribers.]

WAS CHEPSTOW CASTLE BUILT BY THE ROMANS? — Mr. W. H. Greene, in a letter to the *South Wales Daily News*, writes as follows:—"After the series of discoveries that I have recently made in the neighbourhood of Chepstow, I not only unhesitatingly say that the so-called 'Offa's Dyke' is really a grand Roman military work in actual connection with a camp all along the lower course of the Wye, but I further dare to say that Chepstow Castle was partly built by the Romans, and that I can there actually lay my hand on their work. When I began to write my 'History of Chepstow' I referred to the old legend that the 'chapel' (really the 'keep') of Chepstow Castle was built by Longinus, the father of the soldier who thrust his spear into the side of the crucified Jesus, and that I accepted this legend, less Longinus, as serving to show that the Romans occupied this neighbourhood. The discoveries that I have recently made give greater significance and force to the old story, and I have now no doubt that part of the walls which we see in the keep at the present day are actually Roman work. If you go into the Castle Dell and look closely at the walls of the keep, you will see that, in the very lowest part, there is, reaching in height about 12 ft., a course of masonry of very large stones. These closely resemble in character the stones, a yard or longer, laid with such beautiful regularity in the top-most line of ramparts in Llanant Camp, and they further remind one that the late Professor E. A. Freeman, seeing somewhat similar stonework in parts of Caerwent Church, at once gave his opinion that that part was Roman. Looking again at the exterior wall of the keep, you will see superimposed upon the course of very large stones a course of masonry of smaller stones, carried to a further height of about 15 ft., and then there comes the thin red line of Roman bricks, four deep, carried all along the face of the keep. Now, if you go inside the castle you will find on this keep, just above the thin red line, indications of three round-headed arches. I had till now been under the impression that these arches were Norman work. I deeply regret that I can no longer obtain the opinion, always most promptly and courteously given (after the manner of true gentlemen), of the lamented Professor on this point. The lower part of the wall I have no doubt about. Thus, as another of the important result of my discovery of the camp at Tutshill, I am enabled to begin the history of Chepstow Castle at its real starting point—a strong Roman fortress, dominating a passage over the Wye at the side of the present road bridge, and most likely built upon the site of an earlier British occupation. Newspaper controversy on these matters I must decline. This is my little history, and contains my opinions, the degree of value of which will have to be decided hereafter. People will very likely differ from me, and they are at perfect liberty to write books on their own account."

LEGAL.

ARCHITECT'S CLAIM FOR COMMISSION.

FARTHING V. TOMKINS.

This was an action tried in the Queen's Bench Division of the High Court of Justice, by Lord Chief Justice Coleridge and a special jury on (Tuesday last) by an architect for 408l. on a balance of account arising out of the rebuilding of the Provence Hotel, Leicester-square, and it raised again the important question which arose in this Court in a case of "Burt v. Ridout," reported in the *Times* of February 22 last,* and constantly arising—whether, when from want of funds or some other cause a building is not erected, the architect is entitled to charge commission. The defendant had engaged, as he said, to employ the plaintiff upon condition that he should submit plans which could be carried out for 8,000l., and no more, and also on condition that he should procure the necessary finances, but which conditions the plaintiff, as the defendant alleged, had not fulfilled, and therefore, the defendant said he had dismissed him. The plaintiff, on the other hand, claimed "on balance of account rendered for professional services as architect and surveyor in connexion with the proposed rebuilding," also in connexion with certain finance negotiations, 224l., giving credit for 175l. as paid on account, leaving a balance of 408l., while the defendant contended that the 175l. paid was enough for any services rendered.

Mr. Witt, Q.C., and Mr. Rose-Innes were for the plaintiff; Mr. H. Dickens, Q.C., and Mr. F. Low were for the defendant.

After some evidence had been tendered, negotia-

tions took place between counsel, which resulted in their proposing to leave the matter to the arbitration of the Lord Chief Justice.

His Lordship at once assented to this, and saw the leading counsel on both sides in his private room, and afterwards saw the parties personally, and then it was announced that he would give judgment on the following morning.

On Wednesday Lord Coleridge gave his decision, according to which judgment was given for the plaintiff for 210l.

We have commented upon the case in another column, but have no space to give the details of the evidence and the grounds upon which the Lord Chief Justice based his decision. These will be found reported at some length in the *Times* for Wednesday and Thursday, July 4 and 5.

CAPITAL AND LABOUR.

THE CARPENTERS' STRIKE AT REDDITCH. — This strike, which has continued for about a month, has concluded, the masters having acceded to the men's demand for an additional 3d. per hour all round.

MEETINGS.

SATURDAY, JULY 8.

St. Paul's Ecclesiological Society.—Visit to Rochester. Train from Victoria at 10.5 a.m.

MONDAY, JULY 10.

Clerks of Works Association (Carpenters' Hall).—Monthly Meeting. 8 p.m.

TUESDAY, JULY 11.

Glasgow Architectural Association.—Visit to a house, Dalziel Drive. 6 p.m.

THURSDAY, JULY 13.

Incorporated Association of Municipal and County Engineers. Annual Meeting, West Bromwich.

FRIDAY, JULY 14.

Incorporated Association of Municipal and County Engineers. Annual Meeting (continued).

SATURDAY, JULY 15.

Architectural Association.—Visit to Penshurst-place, Kent. Trains 9.30 a.m. and 2 p.m. from Charing Cross.

Incorporated Association of Municipal and County Engineers. Annual Meeting (continued).

Liverpool Engineering Society.—Excursion to the Penmaenmawr Granite Quarries.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

16,556.—CHIMNEY TOPS: *W. Dearn*.—According to this invention, two tubes of any desired section and of such relative size or diameters as to provide between the inner and outer tubes a passage of air, are arranged one within the other. The inner tube is in the form of a truncated cone, with longitudinal openings to increase the draught. The outer tube extends from below these openings to a short distance above the space between the inner tube and a deflector plate. Currents of air entering at the lower end of the outer tube pass out at the top, a portion of the air passing into the inner tube and thereby increasing the draught.

17,739.—MITRE BLOCK AND JOINT CRAMP: *H. Smolinski*. The appliance which is the subject of this patent is of a metallic frame with mitre blocks enclosing in loose fit the mitre joint with a saw cut in the centre for cutting a mitre in mouldings of various sizes. The blocks are operated by screws with knurled heads. When it is desired to use the apparatus as a joint cramp, the mitre blocks and loose pieces of wood are removed for the purpose of placing the angle of the joint in between the face plates of the cramp, the cramp being fixed by means of the screws.

18,251.—GULLY TRAPS: *W. Oates and others*.—Consists in forming the traps in cross section in the shape of a pentagon, hexagon, or polygon, or triangle, so that when the gully is placed against a wall or other surface, the overflow pipe can either be made to project at right angles or to the left or right, so that the trap can be adapted to meet connecting pipes of three angles.

18,754.—LADDERS: *H. F. Richards*.—This consists of a ladder in which the steps or treads are automatically maintained in a horizontal position, irrespective of the angle at which the ladder itself may be adjusted or secured to the structure with which it is used; pivoted brackets are used with each step and automatically adjusted from the top or bottom of the steps.

6,829.—WOOD PAVEMENTS: *F. O. Hartung (Jena)*.—To obviate the disadvantages attendant on the use of wood for pavements as, at present, cracking of the surface, &c., each wood block is fitted with a metal ring which holds the block firmly in its place and prevents swelling of the wood from moisture. The wood blocks are driven tightly, each within the ring which encloses it, for the full depth on all sides.

6,711.—CORNICES, MOULDINGS, AND WALL COVERINGS: *J. Pettigrew*.—To replace the richer class of wall papers, metallic hangings are by this patent proposed to be employed. This metal, which is preferably copper, may be ornamented in relief or colours and may be attached by soldering or other means.

7,955.—HAND PLANES: *G. Leadbetter*.—These planes are provided with guiding strips and stop blocks adjustable so that the planes may be used for stop-chamfering or stop-grooving work.

NEW APPLICATIONS FOR LETTERS PATENT

JUNE 19.—12,009, B. E-march, Joiners' Cramps.—12,023, J. Hind, Machinery for Mixing Paint, &c.—12,028, P. Jones, Clamp.—12,052, Z. Leglay, Automatic Springs for Doors, Windows, &c.—12,054, J. Jones and others, Water-Value Preventers or Flushing Apparatus.—12,055, C. Stockwell and P. Smith, Siphon Tank for Flushing Water-closets.

JUNE 20.—12,079, W. Walton and H. Medlicott, Draught

* And also in the *Builder* for February 25 last, p. 157, with comments on the case on p. 143.

Porto Rico.....	0/0/7	0/1/6	Archangel.....	0/12/6	0 0
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The Builder.

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JULY 15, 1892.

ILLUSTRATIONS.

Interior of Grocers' Hall.—Mr. H. C. Boyes, F.R.I.B.A., Architect	Double-Page Ink-Photo.
The Courtyard, Ightham Mote, Kent.—Drawn by General Luard	Double-Page Ink-Photo.
Ightham Mote, Kent: Jacobean Chimney-piece and other details.—Drawn by General Luard	Double-Page Ink-Photo.
House in Queen's Gate, South Kensington.—Mr. R. A. Briggs, F.R.I.B.A., Architect	Double-Page Photo-Litho.

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The Greater Buildings at the Chicago Exhibition.



THE preliminary steps in the procuring of designs for the Exhibition buildings were, of course, watched with great interest by the American architects.

To Mr. D. H. Burnham, the Chief of Construction, is due the credit, if any, of having vetoed the obtaining of designs by competition. He, no doubt, with his great practical experience as an architect, saw the difficulties and dangers of such a proceeding, at any rate in a case like the present, where a group of buildings had to be designed in harmony one with the other. Moreover, time was short, the designs had to be prepared simultaneously, and this could only be done in a satisfactory manner by frequent consultation between the architects and the Chief of Construction. No surer and no more ideal way of obtaining these satisfactorily can be imagined than by selecting, in this case, ten architects, and forming a council, presided over by the Chief of Construction, whose members could meet in a friendly way and criticise each other's designs to their mutual advantage, and subjugating their own personal feelings to the general advantage of the whole scheme. It is, moreover, a proceeding of no slight importance to English architects that, in a democratic country like America, a blow should have been given to the mania for architectural competitions which is passing through the country at the present time. The position of the buildings and their size having been roughly worked out by Messrs. Burnham and Root (Mr. Root, unfortunately, having since died), and by Mr. F. L. Olmsted, the landscape architect, the designs were apportioned to the different architects, the principal ones on the great court to the New York architects, while the buildings further north were given to the Chicago and Western architects.

It was, of course, apparent that symmetry must be observed in the Grand Court of Honour of the Exhibition, and that any display of a romantic or picturesque treatment must be beyond the formal Reception Court of the Exhibition. It was felt that

some treatment on Classic or Renaissance lines must be adopted, and that with a certain standard of dimensions and modules of proportions, sufficient variety in unity could be obtained to give the whole scheme that personal quality which is so essential in architecture, but which, if uncontrolled, is liable to run in the opposite direction. The buildings are, therefore, planned in relation to each other and on axial lines. A general cornice line of 60 ft. from the ground was then agreed upon as being suitable to the requirements of the case in relation to the court, and further it was agreed that the module of proportion as to their façades should be a bay not exceeding 25 ft. in width. Beyond this, each architect was left to himself to develop his own design, with the aid of the mutual criticism which occurred at the meetings of the architects.

The selection of the material to be used in the erection of the buildings had, of course, to be carefully considered in every aspect as to appearance, suitability, and cost, and also as to salvage at the close of the Exhibition. Various reasons operated in inducing the architects and the Chief of Construction to adopt the use of steel as the material in which to carry out the designs committed to their charge.

Chicago is one of the great centres of the timber trade; timber of all sorts and sizes is shipped there, and it is the cheapest possible building material; it could be used in stock sizes, and this has influenced the designs to a large extent, and when the buildings are pulled down at the end of the Exhibition the salvage will be considerable, and the timbers being used in marketable lengths will render them easily saleable. As a covering to this woodwork, steel was eminently a material capable of being manipulated with ease for the purposes of architectural decoration, and of sufficiently durable properties to make it last the period for which the Exhibition buildings would be required. The material, which was used for some of the smaller buildings at the last Paris Exhibition, is composed of one part best Portland cement and five parts plaster of Paris to which enough long hemp fibre is added to bind it thoroughly together. This is then nailed in blocks with long round nails to the wooden framework, the joints made good with plaster of Paris, and the whole cleaned down. The effect is an effect entirely its own; it

resembles white marble a good deal, but is preferable under a strong sun in having no perceptible glitter, while against a dark blue sky or at night with the electric light on it the result is very fine.

The Administration Building, by Mr. Hunt, President of the American Institute of Architects, is, from an architectural point of view, probably the most important building on the grounds, in that its purpose is to serve as the grand entrance portal to the Exhibition.* As has been mentioned, it has been placed on the western extremity of the main axis of the great court, its transverse axis running north between the Mines and Electricity Buildings, &c., through the chief entrance of the Machinery Hall.

On the west is the great Railway Terminus, with its immense hall designed after the Baths of Caracalla at Rome. This station empties the crowds of visitors into the Central Dome, which forms a fitting vestibule to, the Exhibition itself. Looking straight in front after entering, through the eastern doorway a view of the great fountains is obtained, and beyond, at the other end of the great basin, 1,100 ft. by 350 ft., stands the statue of the Republic, with the peristyle beyond, with its centre crowned with a quadriga, through which is seen the broad expanse of Lake Michigan, which is itself 60 miles across.

From the importance of the position, it thus became necessary to have entrances on each of the four sides of the structure, because of the importance of all of them. The area given to Mr. Hunt was a square of 260 ft., and on this he projected a structure, the centre of which is an octagon carried up into an octagonal dome, whose internal diameter is 120 ft., and internal height 220 ft., and external height 275 ft. It will thus be seen that the dome on plan is 12 ft. wider than that of St. Paul's, London, that the height of the interior dome is 20 ft. lower, and that of the exterior about the same as our Metropolitan Cathedral, not, of course, including the lantern. Round this inner octagon is placed an outer one, about 24 ft. deep, the space between on the diagonal sides being occupied by staircases and lifts, and on the entrance sides by the vestibules and colonnades. On the diagonal sides are four pavilions 84 ft. square, and four stories in height,

* We gave an illustration of this building in the *Builder* for August 8, 1891.

in which are accommodated the various departments of administration, such as the fire, police, ambulance, and foreign departments. These four pavilions are 60 ft. high to the top of the main cornice, which is the height agreed upon by the architects for the main buildings on the great court, and this brings the pavilions into relation with the façades around it. The pavilions are enclosed under one Doric order raised on a pedestal, and with an entablature and balustrade above, and are covered with a flat roof; and on each of the three angles is placed a group of statuary, allegorising the Elements and their capacities, and other subjects.

There is a severity and dignity in the Doric order to these supporting pavilions, which contrasts well with the more elaborate Corinthian order adopted in the main buildings on either side. Between these pavilions are recessed the great portals to the dome, one on each cardinal face, being flanked with sculpture representing the elements, "Fire," "Water," "Air," and "Earth," on one side of each doorway in its natural unsubdued state, and on the other in the service of man.

The elevation may be said to be divided into three parts in height, the pavilion story, of which we have just spoken, the colonnade story, and, lastly, the dome. In the colonnade stage, which is about 70 ft. in height, the diagonal corners containing the lifts and staircases are continued and boldly expressed, being taken out square on plan from the diagonal face of the octagon, thus forming a longer space for the Ionic colonnade which occurs between the angles; each of these angle pavilions is covered by a dome, coated with aluminium bronze, supported on the angles with two groups of statuary representing the culminating points of human nature, such as Art and Science, War and Peace, &c.

The third stage in the design, consisting of the dome itself, rises on the inner shell, thus forming an external walking way above the colonnade; it rises vertically for a height of 30 ft., being octagonal on plan, and ornamented with flat pilasters, between which are three panels on each face, on which are inscribed the names of men famous in science, art, and industries. Above the cornice which surmounts these pilasters are placed eagles at each of the edges of the octagonal dome; from this point rises the external dome, with three long panels on each face, reaching nearly to the top, the main ribs continuing till a height of 275 ft. is reached. The whole is covered with a glazed skylight 38 ft. in diameter. The panels of the dome are treated in aluminium bronze, as are also those of the smaller angular domes mentioned. The remainder of the exterior has been kept white with the exception of the wall behind the colonnade, which has been painted a red terra-cotta colour, which serves as a background for the Ionic columns and emphasises this part of the design.

Mr. Hunt's building differs from most of the other great structures in having an interior as important as the exterior. Each of the faces of the octagon internally is occupied by a semi-circular opening; four of these form the entrances and four open into the space containing the lifts and staircases, with a floor at the level of the springing of the arches. Above is a frieze 27 ft. wide, filled with figures in low relief on each side. These figures are in white on a light blue ground. Surrounding this frieze is a heavily decorated cornice supporting an immense gallery, projecting about 3 ft., above which rises the octagonal drum of the dome itself, ornamented with slightly projecting pilasters; between these at the top are placed latticed windows lighting the interior. The interior dome, introduced as at St. Paul's and elsewhere for the purposes of proportion, starts from the cornice which crowns these pilasters and finishes at a height of 190 ft. from the pavement, with an opening 50 ft. in diameter which admits the light from the

opening in the outer dome. This interior dome is treated with ribs and panels and painted in light blue and gold. The whole of the upper part had to be decorated by the electric light by Mr. W. L. Dodge, because of the scaffolding, and this may have influenced the scheme of colour to some extent. In our opinion it is in somewhat too light a key; something bolder and stronger was, perhaps, wanted for such a composition and on such a scale. Through the inner opening the light penetrates from the opening at the summit of the outer dome, which is painted internally by Mr. Dodge with an allegorical group entitled the Glorification of the Arts and Sciences consisting of Apollo as a central figure, with a procession extending around the dome representing the arts, sciences, and industries. The great drawback of this piece of work is that it is impossible to see it to advantage; only a portion of the composition can be seen at one time, the inner portion being somewhat awkwardly cut off by the inner dome. It is worthy of note that Mr. Hunt had in his mind when designing this dome the great uncovered opening in the Pantheon at Rome, and that he intended to carry out the same idea in his own building, but that questions of utility and climate intervened, and he thought of the great central space in showery weather not being available for use as a shelter, and reluctantly abandoned the idea and glazed the outer surface. The effect, however, of the central lighting remains the same.

There can be no doubt that the composition as a whole is a most effective one, and forms a fitting reception hall to the Exhibition. The idea of having a monumental headquarters does not seem to have occurred to previous projectors of great exhibitions, and it is certainly a new departure. This monumental dome of Mr. Hunt's will bear the same relation to the Chicago Exhibition, as Paxton's glass-house did to our own 1851 Exhibition or the Eiffel Tower to the last Paris Exhibition. Granted the fact that an exhibition wants its various departments of management, and you have at once the key-note to the idea, and if they can be placed in a building so designed as to raise it to the dignity of a monument and forming a grand entrance vestibule to the whole Exhibition, it is at once a logical and a proper thing to do.

In this respect the administration building is a long way ahead of the Eiffel Tower at the last Paris Exhibition, which, besides being ugly and out of scale, was practically useless with the sole exception that it formed a landmark of the Exhibition.

About the sculpture in the building little has been said, it being proposed to treat of this separately in a future article. We must, however, mention that Mr. Karl Bitter, of New York, is the sculptor, and that he has treated it in such a manner as to aid the general effect. The whole scheme consists of twenty-eight groups, the most remarkable of which are the four elements: "Fire," "Water," "Air," and "Earth," allegorised and placed at the four great entrances. On one side is the element in its natural unsubdued condition, while on the other side it is represented in the service of man and subdued by him. The idea is a novel one, and has been well carried out. It is a curious point, but no illustration yet published has, in our opinion, done justice to this Administration Building by Mr. Hunt; in the illustrations, and even in photographs, the building has a hard appearance which does not belong to it in reality.

To the south of the Administration Building, and having a frontage of 840 ft. on the great court and 500 ft. to the S. Canal, stands the Machinery Hall, by Messrs. Peabody and Stearns, of Boston. To give an idea of the extent of the structure, it may be mentioned that in comparison with the Houses of Parliament at Westminster, it stands in the relation of five to two as to superficial area. In designing these great structures the architects had in every case to consider that

the form of the structure and the composing materials should be of a marketable nature at the conclusion of the Exhibition. These conditions induced the architects to plan three typical railway sheds 130 ft. wide, placed alongside one another, the naves running east and west, with a height of 100 ft., and supported on trusses 50 ft. apart, centre to centre. These trusses are built up, the inner and outer members connected with lattice bracing. One point about the iron-work is that it has only been oiled at the works and left in that state, several thousand pounds being thus saved, while the effect is infinitely superior to ordinary painted work, a certain amount of tone being obtained of varying dull reddish brown tint which is very pleasing. The trusses are connected at the top with a pin connection, and also rest on a steel pier at the base, as the roofs at the Paris Exhibition of 1889.

Crossing these great naves at right-angles, and on the axis of the main north entrance, is a transept of the same width, covered by three iron domes of the same diameter, and raised on low drums, and the pendentives filled in with light iron framing. These domes give a justifiable, and indeed necessary, importance to the main nave, from which the others open out on each side, and which, when entered from the main entrance on which it abuts, opens out well in front of one, and prevents any confusion likely to arise from two naves of the same width crossing one another. The interior of the building proper contains no galleries, as in most of the other great buildings, the machines of course requiring a good clear height.

In the four angles are circular staircases leading to the galleries, both interior and exterior, formed in the enclosing architectural screen which envelops the internal structure; besides which, on either side of the north and east entrances, are spacious staircases. As has been said, the architects to the great court agreed that covered ambulatories should be provided on the ground floor for the purposes of shelter from the great heat of the sun at Chicago in the summer months, and also for a shelter from the heavy showers which come on without much notice during unsettled weather. It was also agreed that for the purpose of general effect and of symmetry the height of the main cornice should be 60 ft. The plan of the Machinery Hall then developed itself. The enclosing screen, 50 ft. wide, encircling the main structure where it crosses at the angles, naturally resulted in pavilions, 50 ft. square, at these points, while in the centre of each façade covered porticos are so designed as to emphasize the main entrances. The façade is laid out on centres which are multiples of the main trusses, placed 50 ft. apart, four divisions occurring to each bay, and consists of a lower rusticated storey, forming an ambulatory, and pierced with semi-circular arches and rusticated, upon which rests an open colonnade of Corinthian columns, crowned by a cornice and entablature. The treatment reminds one somewhat of Perrault's colonnade at the Louvre, in Paris. The central *motif* in each façade takes up, with the two towers, the width of the nave of 130 ft. wide, which is thus truthfully expressed externally. In order not to form too strong a contrast at the angles, and to bring these pavilions into relation with the screen wall, the Corinthian colonnade is continued round these, being slightly projected in front, and thus gaining a shadow effect. These pavilions are crowned by circular domes raised on a circular drum, pierced with semi-circular headed windows, which light the interior glazed dome, the outer dome being crowned with a lantern, bringing the whole height of these up to 130 ft. The angles on plan left by placing a circular dome on the square base are filled up with open campanili of small Corinthian columns supporting a concave roof, these features being richly treated with finials, &c., in the most ornate Spanish Renaissance manner.

The two main entrances are treated in a very bold manner. It seems as if the architects had determined to get contrast at all costs with the elaborately treated main colonnade. All the main horizontal lines are stopped against the perfectly plain face of the lower part of the two towers flanking these entrances, which start boldly up from the ground without any base and perfectly plain for a height of 90 ft., when they are connected across the central entrance with a strongly-marked horizontal cornice. Upon these towers are raised very elegantly designed campanili on Spanish Renaissance lines in three gradually diminishing stages on the north front, and in four stages on the east front; those on the north being apparently kept lower, so as not to interfere with the Administration Dome. The towers on the east façade contain a very fine peal of bells, whose tone and rendering remind one forcibly of those so well known at Bruges, Ghent, and other Belgian cities, which ring out every day for half-an-hour or so, and give an air and suitability and appropriateness to the whole conception which is very refreshing, and which, if there had been no *raison d'être* in their design, and they had only been placed there for architectural effect, would naturally have been wanting. Each tower is crowned with a winged figure representing Victory. The walls behind the colonnade on the first floor are pierced with windows in two heights, in which Spanish Renaissance dressings are introduced, and figures of infants are largely introduced in the frieze over, holding mechanical tools and bearing festoons of chains of implements instead of the traditional flowers and fruit, &c., and thus bearing out the purposes to which the building is put. The coloured decoration to this covered colonnade is in blue and gold, and the capitals of the Corinthian columns are picked out in gold leaf along the whole façade.

The semi-circular roofs to the great trusses express themselves rising on the inner walls of the colonnade, and are seen from a distance best, being 50 ft. back from the face, and above these, where they occur on the plan, are seen the three domes over the great transept treated simply with a circular drum with louvres for ventilation, and crowned with winged figures.

Returning to the central porticoes, the least satisfactory point is, perhaps, the *appliqué* appearance which the two porches have, the circular one 95 ft. deep and 75 ft. wide, and with Corinthian order 60 ft. high, opposite the Administration Building and the square projection porch on the east front. The whole design gains much from the sculptor's art. Mr. A. Waagen has been entrusted with this. Over the semi-circular portico he has placed six figures bearing portraits of prominent inventors, above these and resting on pedestals supported by the great cornice connecting the two towers are five figures 13 ft. high, the centre one representing Science, and those on either side "Fire," "Water," "Air," and "Earth," the two towers being crowned with a figure of Victory.

The pediment in the eastern entrance represents "Columbia" seated on a throne, to the right and left are inventors of machinery, while the lower corners are filled in with lions, representing brute force subdued by human genius, represented by two children.

Messrs. Peabody & Stearns have certainly produced a work which, although designed on strictly classical lines, possesses enough variety in its general features to give it sufficient interest, especially as the architects have adopted the architecture of the land of Columbus as the fountain-head from which many of the ornamental features have been borrowed.

The Agricultural Hall, by Messrs. MacKim, Mead, & White, occupies the larger part of the south side of the great basin to the Court of Honour, and is bounded on the west by the southern portion of the Lagoon, which runs south from the great basin, and

on the east by the shore of Lake Michigan itself. The building covers a space of 800 ft. long by 500 ft. deep, being practically the same size as the Machinery Hall, which faces it on the west. There is, besides the main building, an annexe on the southern side of 550 ft. by 300 ft. The main building consists primarily of two central naves 95 ft. wide crossing one another at right-angles on the longer and shorter axis of the building. These are roofed with trusses of very light construction, in this respect differing from the well-designed trusses of the Machinery Hall opposite, which, it will be remembered, were built so that they could be sold for railway stations at the end of the Exhibition. The construction of the roofs to the Agricultural Building is a composite one, wood entering largely into the design; the height of the central nave is 75 ft., and the lantern which runs from end to end of these naves is made entirely of wood.

On each façade is a covered ambulatory, as agreed upon by the architects. Each of the great naves mentioned is accompanied on each side by two-storied aisles, kept sufficiently low to allow of a clearstory being formed in the upright portions of the great naves. Running longitudinally east and west on each side of the aisle to the great nave are planned three further aisles of lower height, arranged with skylights, and two stories in height, the first floor of the centre one being, however, left out for the admission of light to the ground floor, while the roof of this centre aisle is taken higher for the purpose of forming a clearstory. On the outer faces to the façades are formed galleries on the upper floor, the lower portion being treated as a covered colonnade as mentioned. On the east and west sides the galleries on the first floor are about 50 ft. wide, while on the north and south they are only 23 ft. This was necessitated by the placing of the main or north façade, and is expressed truthfully on each face of the building. On the centre of the main front facing on the great basin, and emphasising the main nave, running north and south, is placed a dome, 78 ft. in diameter and 130 ft. high, surrounded internally on the ground floor with Corinthian columns of the same height as the main external order and placed in pairs. The dome is coffered internally. The aisles on either side of this nave are accentuated on the façade by masses which form solid wings to the portico which is placed between them. Where the surrounding galleries meet they naturally form corner pavilions, which are differently treated on each face, in order to properly express the plan, and are crowned with low square pyramidal stepped domes, crowned with a group of four women, representing the four continents of the world, supporting a globe. The motif of the façade consists of a Corinthian order of 50 ft. high, without pedestals, supporting an entablature 10 ft. high. The central pavilion on the north front has eight pilasters, the four central ones having Corinthian columns in front, which are carried up with a small attic with figures, and crowned with a pediment. To each of the end pavilions of the same front are four pilasters, figures also occurring above the main cornice and below the square pyramidal dome. The space or curtain wall between these main features on either side is further divided up by two massive piers, consisting of two pilasters with a doorway in the centre on the ground floor, and which serves not only to prevent monotony in the façade, but also answers the purpose of emphasising these doorways. The main cornice breaks around these projections; above are placed groups of statuary, representing Agriculture in various phases of bucolic labour. Thus the architects appear to have marked the entrances to the structure in a manner befitting their importance; the central, or more important one with eight pilasters, the four central ones having columns in front with pediment over, the end doorways with four pilasters, the pavilion being crowned

with a dome, and the intermediate or minor entrances, two to each curtain wall, with coupled pilasters to a projecting pier, and crowned with a group of statuary, while the full-sized order occurring at well-defined points serves to keep the design well knit together. The space between these piers is again further sub-divided into three bays, the lower portions of smaller Corinthian columns, supporting the gallery on the first floor and carrying an entablature at the gallery level, at which point they are connected with semi-circular arches, divided by figures representing the signs of the Zodiac, and supported on projecting Corinthian columns. The spaces between these columns are again sub-divided into three by columns of the same order, which express on the façade the spacing of the wooden columns used internally to support the floors. The façades to the lake and to the small lagoon develop themselves from the plan, the angle pavilions being emphasised and treated with projecting porticoes, crowned with a tympanum filled with sculpture, and on each side, buttressed, as it were, with flanking piers, and crowned with the low pyramidal domes which show, of course, on the main front with the four female figures holding aloft the globe. These porches express on the façade the open aisle extending behind of a width of about 43 ft., the blocked-up portion or flanking piers representing the line of the columns supporting the gallery floors. The central pavilion to these fronts does not project, but is so grouped with the piers on either side as to emphasise the great nave going east and west. These piers are treated the same as on the main front, and are crowned with statuary, while the curtain walls on either side consist only of a three-arched bay split up again into three divisions as before.

The roofs, which are of low pitch and crowned with slight pitch, are seen above the main cornice. The Agricultural Building is by far the richest of the buildings which face the Great Court; not even, we think, excepting the Administration Building itself. It seems, in fact, designed from its commencement for a profuse treatment in sculpture, and it is doubtful which holds the greater prominence in the composition, the sculpture or the architecture proper. The sculpture proposed has been carried out by Mr. Philip Martiny, of Philadelphia, and has been conceived by him in a very bold spirit, perhaps allowable, and even justifiable, by the gigantic order employed throughout the design. Each group represents some agricultural subject. Besides the four corner pavilions already mentioned, Mr. Martiny has produced a group of horses led by two labourers and drawing a chariot in which stands a figure representing Agriculture, and also a group of oxen led by a figure, and drawing the ancient beam plough of Virgil. These two groups, which are duplicated on the façades, are placed over the piers containing the intermediate doorways, and are executed with much vigour. The groups in the four pediments to the porticoes at the ends of the smaller façades, which represent Agriculture, the women holding the signs of the Zodiac over the smaller Corinthian columns, and two groups of the Four Seasons were also executed by Mr. Martiny, while Mr. L. J. Mead, of Florence, has executed the central pediment, representing Ceres, the Goddess of Agriculture. The dome over the central entrance is crowned by a gilded figure of Diana, 18 ft. high, which formerly stood on the Madison-square Tower, New York. The right foot of the statue rests on a small ball, which turns with the wind.

The colour decoration will be more specially noted later; on it has been executed by Mr. G. W. Maynard, a painter of note in the States, and is in the Pompeian style. The central portico and the four end porticoes to the minor façades are the points at which colour is applied, and it serves its purpose of accentuating the design at these points where it is needed, besides being under cover, and therefore protected from the elements. The

whole scheme is treated with rather strong colouring, and is composed of figures singly and in groups, relating to agricultural traditions. From these remarks it will be understood that the agricultural building is very rich in its general effect, so much so as almost to be called sumptuous; it might even be said by some that too much sculpture had been used if it were for a permanent building, but for a temporary structure we think it errs, if at all, on the right side. Being designed with its colossal order, and being emphasised also by bold masses of plain masonry, it carries the sculpture applied to it, with a certain sense of contrast, which is very pleasing.

The proportions of the whole are good, and the general setting out of the elevation, so as to emphasise certain features in the plan, seems very well thought out. The broad terrace in front and the broad flight of steps leading down to the main basin also help to bind the whole design, so as to make it form part of the whole scheme, and to cause it to pile up gracefully from the water's edge, which serves as a base to the composition. It is in general effect more sedate than the Spanish treatment of the Machinery Hall, which faces it across the smaller lake, and must add largely to the reputation of the architects, Messrs. MacKim, Mead, & White, of New York, who already hold such a high reputation among our professional brethren in the United States.

SOME EXPERIMENTS ON CONCRETE BEAMS.

THE title of a paper in Vol. CXI. of the "Proceedings of the Institution of Civil Engineers" (1892-3, part I.), caused us to turn to it with considerable interest. The title runs:—"Strength of Concrete Slabs, by Sidney Richard Lowcock, Assoc. M.Inst.C.E." We trusted to find that, at last, some valuable experiments had been made which might furnish data for the construction of concrete floors. The experiments of Colonel Seddon* on concrete slabs, supported on all the four sides and uniformly loaded until they broke, were in the right direction, but further experiments on other kinds of concrete, and more especially on slabs fixed on all the sides were needed, so that more accurate constants might be deduced. Our hopes that Mr. Lowcock's paper would disclose the results of such experiments were speedily overthrown, for the "concrete slabs" were neither more nor less than beams, supported at the two opposite ends and loaded in the middle. As far as they go, the tests are useful; we cannot but regret, however, that they did not go further, and if Mr. Lowcock will continue them in the direction indicated by the title of his paper, he will confer a benefit on architects and engineers alike.

A brief résumé of the experiments will be of interest. The slabs, or rather beams, were made with good Portland cement (which had a tensile strength of 665 lbs. per sq. in. at 7 days), and "clinker obtained from furnaces which burned ash-pit refuse." The clinker was crushed in an ordinary mortar-mill, and was afterwards passed through a screen with $\frac{1}{2}$ -in. meshes, and thoroughly washed with clean water. Unless the washing was carefully done, it was found that the concrete "swelled and blew after setting." Three different proportions were adopted, namely (A), 1 part cement to $\frac{1}{2}$ parts clinker, (B) 1 part cement to 6 parts clinker, and (C) 1 part cement to 6 parts clinker as above, and 2 parts clinker ground to the fineness of coarse sand. The concrete was well rammed into greased wooden moulds. Slabs of three different sizes were made of each mixture, namely, 21 in. x 18 in. x 4 in., 30 in. x 18 in. x 6 in., and 39 in. x 18 in. x 9 in.; they were kept dry until tested. The supports for the different-sized

slabs were 12, 18, and 27 in. apart respectively.

If we base our calculations on the formula, $W = \frac{3}{8} C \frac{BD^2}{L}$ (where W and C are in cwts., and B, D, and L in inches), we can find the value of C for the different mixtures. For concrete (A)—proportion 1 to $\frac{1}{2}$ — $C = 1.9^*$ at the age of fifteen days, and 2.8^* at the age of twenty-one days; for concrete (B)—proportion 1 to 6— $C = 1.2^*$ at the age of fourteen days, and only 1.1^+ at the age of twenty-one days; for concrete (C)—proportion 1 to 8— $C = 0.3^+$ at the age of fourteen days, and 0.4^+ at the age of twenty-one days.

The individual beams in the two last series vary considerably, some being twice as strong as others, and, as the total number of "slabs" of these series was only 15, of which four were damaged prior to testing, the "constants" deduced are not very reliable. Indeed, all the tests were carried out at too early dates. The single beam of the 8 to 1 concrete, which was tested at the age of fourteen days, was "not dry through," and consequently not in a fit state for being broken. In the other cases also, more uniform and more valuable results would have been obtained if the beams had been a little older. But the tests will have the effect of drawing further attention to the importance of keeping the supports of concrete floors in position for as many weeks as possible, more especially when the proportion of cement to aggregate is small. They also corroborate previous experiments, which have shown the unsuitability of concrete, when used alone, for resisting transverse stresses; for the beams tested by Mr. Lowcock yielded suddenly and totally, no sign of fracture, except in one instance, appearing before the collapse.

It must be borne in mind, however, that the beams were merely supported at the ends. Had they been fixed, the probability is that the lower surfaces would have cracked long before the beams actually collapsed. In other words, the concrete would have formed itself into a kind of arch, part of it opposing a compressive resistance to the stress of the load, and part of it (underneath) being at the same time cracked, and consequently worse than useless. It is this behaviour of fixed concrete beams and slabs which renders it impossible to calculate their strengths from constants deduced from experiments on beams and slabs which have been merely supported. We hope that the next gentleman who tests concrete beams and slabs will see to it that some of them have their ends and edges securely fixed. In this way only can a rule be formulated which shall foretell the strength of other beams and slabs with an approximation to accuracy.

On the whole, Mr. Lowcock's tests give somewhat low results, but this is due to the early dates at which the tests were made, and, perhaps, partly to the nature of the aggregate. A beam, composed of equal volumes of Portland cement and coke breeze, and tested in 1891 by Mr. David Kirkaldy, yielded a constant of 5.9, although the beam was only seven days old; while a much larger beam, composed of one part Portland cement and four parts clean breeze, and tested by Colonel Crozier, yielded a constant of no less than 4.1, but the age of the beam was forty-three days. As the strength of Portland cement varies pretty nearly as the cube root of its age (within reasonable limits, of course), a beam similar to that tested by Colonel Crozier might be expected to furnish a constant of 3.3 at the age of twenty-one days, or 17 per cent. in excess of the average obtained by Mr. Lowcock for beams of slightly inferior composition, but only 6 per cent. in excess of the strongest beam of similar composition tested by him. The twenty-one days' tests of the $\frac{1}{2}$ to 1 con-

crete are therefore remarkably similar to Colonel Crozier's test, but the results of the experiments on the two weakest concretes are not sufficiently regular to be of much use. This really does not matter much, as coke-breeze concrete weaker than 1 to 4 or 5 is seldom used where it will be subject to transverse stress.

It may be added that the weight per cubic foot of the $\frac{1}{2}$ to 1 concrete was 118 lbs., and the compressive strength, at the age of fifteen days, was 1,120 lbs. per square inch.

In the same volume of *Proceedings* four papers on graving-docks are printed, together with the discussion and correspondence which followed the reading of the papers. Some interesting information on concrete is given, but to this we merely allude in passing. A few words of Sir Benjamin Baker on theoretical investigations of strength may, however, be quoted, as they have a special significance when spoken by an engineer who must have had recourse very largely to such investigations. After referring to the strength of concrete beams, he said:—"Bearing upon the general question of the value of theoretical investigations of strength, in cases such as a flat concrete invert, as compared with direct practical experience, I may say that several cases recently have made me a little nervous as to whether the results of the high technical training of the present day with many young engineers do not lead to a dangerous confidence in theoretical deductions and the use of formulas. No one can charge me with contempt of theory; but cases have been brought under my notice rather frequently of late, showing too great confidence on the part of young engineers in theoretical deductions; in preference to going to the same extent as their predecessors had been in the habit of doing to previous examples, in order to see what was the right proportion to adopt in a particular work." And again, "Theoretical knowledge is no substitute for the practical experience upon which our predecessors in this Institution have chiefly relied."

Certainly it sounds somewhat strange to hear a master of theoretical investigations (for the designer of the Forth Bridge cannot have been otherwise) discounting such investigations in this way, but there can be no doubt that his words are words of wisdom, and are especially to be pondered in connexion with calculations of the strength of concrete beams. For the ordinary rules, which give the strength of fixed beams as double that of beams simply supported at the ends, do not apply to concrete. Fixing the ends of a concrete beam may treble or even quadruple its strength, while, instead of yielding without previous fracture, the underside of such a beam may crack long before the upper surface yields. From this it is clear that a concrete beam with fixed ends is, to all intents and purposes, an arch, and theory has not yet, on account of the paucity of experiments, formulated a rule for calculating the strength of such an arch.

Sir Benjamin, however, does not condemn theory; he would merely have it conformable to right practice, as it ought to be.

NOTES.

IN a letter which we publish in another column, Mr. Leonard Stokes, in reference to our comment on Lord Coleridge's utterance in a recent case, raises a protest against the system of 5 per cent. charging by architects. We have always held, and have more than once expressed, the opinion that the system is a radically bad and illogical one, and agree with all the reasons given for this opinion in Mr. Stokes's letter, except so far as this—that we do not see that the architect ought to be considered as laying himself open to the imputation of increasing the cost of a building in order to keep up his fees. Architects are no more open to such a charge than doctors or

* Average of three tests.
+ Average of two tests.
† One test only.

lawyers. A physician who charges a guinea for each visit is under just the same inducement to multiply his visits and to keep a case running on as long as he can. A barrister who is paid, in addition to his retaining fee, in proportion to the number of days he has to attend in court in the conduct of a case, is in the same position. But the charge of endeavouring to lengthen out the case or the proceedings in order to increase his fees is very rarely made against a physician or a barrister, and in fact the mere making it would generally expose a man to obloquy and to the charge of want of knowledge of the world. Why is it to be supposed that there is any more fairness and reason in making such an odious charge against the architectural profession? As far as the Institute is concerned it appears to us that as long as the majority of architects are content to accept the percentage system of charging, the Institute, which is the representative body of the profession, is almost bound to set up a standard for the guidance and support of its members. They would have a right to complain if it omitted to do so. If a majority, or even a considerable minority, of members of the Institute, would agree to memorialise the Council in favour of the abolition of the percentage system, it would then be the manifest duty of the Institute to reconsider the question. That is the direction in which Mr. Stokes had better move, if he wishes to accomplish a reform. The question, however, has little bearing on the peculiar views of learned judges on this point. If an architect, resolving to abandon the percentage system, had informed his client that his fee for designing and superintending a certain building would be 1,000*l.*, and if the building project were abandoned after the plans and designs were fully made out, he would then be fairly entitled to charge at least half the stated fee, 500*l.* But he would be told all the same by Lord Coleridge that he was not entitled to it, because he was to be paid to produce a building, and had not done so. The most powerful argument against the percentage system is that mentioned by Mr. Stokes, that it reduces all architects, whatever their abilities, to the same level, and obliges an architect of exceptional powers to multiply his works beyond what he can properly attend to himself, in order to reap any advantage from his special ability; whereas if he charged in proportion to the value set on his work, he could make the same income by giving his full attention to a limited number of buildings. That consideration alone is sufficient to condemn the percentage system, though that is perhaps the only really grave and serious objection to it.

AFTER a long pause the German Archaeological Institute has issued another instalment of the *Antike Denkmäler*—forming the first number of the second volume. It contains a publication of special interest to architects, *i.e.*, that of the new drawings and plans of the so-called "Tholos" at Epidaurus, by the German architect, Herr Herold. The general structure of this most curious building is well known from the preliminary publication in the Athenian *Παυσανίας* of 1882, but the discovery since then of the inscription, with the building accounts of the Tholos, has made it possible to attempt a much fuller restoration. Moreover, it has given us the real name of the building, which though in its purpose substantially the same as the Tholos at Athens, was actually known as the Thymele. The full discussion of the inscription in relation to the extant ground-plan and fragments, Dr. Dürpfeld reserves for the next number of the *Jahrbuch*, but he appends to Herr Herold's plans and restorations a brief explanatory text. The structure was, as its name implies, an altar-building. The entrance lay on the east side directly facing the great altar, the remains of which have been found to the south of the temple of Asklepios. The building consists of six concentric walls, the actual

and restored state of the foundation of which Herr Thorold gives together as one plate. The three outer ones are of substantial breadth, the three inner ones remarkably thin. The three inner ones form a curious labyrinth, the doors in them being broken at each place, and little partition walls so intercepting that a person entering the periphery must traverse the whole to penetrate to the centre. The purport of this must, it seems, have been a ritual one, but it remains wholly unexplained. The outer colonnade is of porous limestone, and the Doric columns that compose it are, from the shape of their echinus, clearly younger than the Parthenon, the architrave being in form and proportion that in use in the fourth century *a.c.*, but with this peculiarity that the metopes are decorated with richly sculptured rosettes. The inner colonnade was of the Corinthian order, and of extraordinary beauty.

L'ARCHITECTURE for July 8 publishes a letter from M. Harmand, advocate in the Court of Appeal at Paris, to the President of the Société Centrale des Architectes, on the subject of the copyright of architects in their works. The tendency of the letter is in favour of recognising the right of the architect in his design. M. Harmand does not see why he should be considered in any different position from an author in literature, who has an absolute right to prevent any one appropriating or publishing his work. M. Harmand does not confine his view to the mere drawings of the architect; he says the architect can affix his signature to his work, whether it be the drawings or the executed building. He admits that there is nothing to prevent the proprietor from altering and even spoiling the building, without the intervention of the architect, but argues that in that case the architect should have the right to demand the suppression of his signature, if the alterations made in the building appear to him at variance with his conception. This, however, is rather cold comfort. On the other hand M. Harmand is careful, he says, to confine the copyright of the architect strictly to those buildings "ayant un caractère original et un mérite artistique." Exactly; but who is to define that, or to draw the line between buildings which have and buildings which have not sufficient artistic merit to constitute a claim to copyright? We can fancy the bewilderment of judges, counsel, and jury, if such a case came to be argued in an English court of law! Whether it would have more chance of solution in a French court we cannot say. On the whole, we fear, M. Harmand's opinion, though of interest, is not calculated to alter our conviction that the copyright in an architect's executed buildings will be difficult if not impossible to establish by law.

THE appearance of Herr Ohnefalsch-Richter's "Kypros, the Bible and Homer" cannot pass unnoted, but it is a book that would have been full of disappointments had anyone ventured much hope. Heralded by a *facsimile* letter of the most non-committal kind from Mr. Gladstone, dedicated to a princely patron, it is big with all that advertisement may furnish, and barren of nearly every quality a scholar prizes. The vast material has never been arranged, much less sifted; theory everywhere is of the crudest, and whole pages are devoted to the details of personal squabbles and the elaborate vindication of unimportant personal priority. Mr. Ohnefalsch-Richter seems to have been ill-used by nearly every archaeologist of distinction, a fact or fancy enough in itself to give us pause. What remains of permanent value in a chaos which we scarcely like to call a book is in the main the observation, always alert and intelligent, of modern Cypriote customs. Much more of this would have been welcome; it is a field as yet little

worked. The careful severance too of objects found in distinct tombs, and the description of the lie of their discovery is a good trait. If Dr. Richter had contented himself with excavating, and got some educated man to write his book, we should have owed him a double debt.

EVERY archaeologist—and especially those who have not been able recently to visit Greece—will be grateful to Mr. Cabbadias for giving us the first livraison of his "Fouilles de Lycosura." The prototype plates contain the three great heads of Demeter, Artemis, and the mythologically problematic Anytos, as well as a piece of the remarkable embroidered ritual robe. The colossal size of the torsos discovered has so far prevented their being brought to Athens, and the restoration, and, of course, complete discussion of the figures cannot as yet be attempted. When this is done, we may hope to have before us not only a fairly complete work by the great sculptor Damophon, but also what is, perhaps, more important, we shall have an authentic picture of a great *cultus* group. Meanwhile, it is a great thing to have the heads accessible. In the text Mr. Cabbadias gives a description of other important fragments discovered, and also a plan of the Lycosura temple.

THE Congress of the Royal Archaeological Institute, which is being held this year in London, began on Tuesday. The day was occupied by visits to St. Bartholomew's the Great, Smithfield, and to the Charterhouse. In the evening a reception of the members took place in the Guildhall Museum and Library, on the invitation of the Library Committee of the Corporation of London, a large number of ladies and gentlemen of literary, scientific, and artistic pursuits having been invited to meet them. The fine suite of rooms is well adapted for meetings of this description, and the aspect of the museum and galleries, brilliantly lighted and filled with guests, was admirable. The reception took place in the library, where, at eight o'clock, Mr. A. A. Wood, Chairman of the Library Committee, supported by leading members of the City Corporation, welcomed the numerous guests. Apart from the usual objects contained in the museum—a collection of which the City, once so negligent of its antiquities, may now well be proud—many other exhibits were on view, either specially for the evening, or temporarily. Among these, a beautiful series of Tanagra figures, lent by Mr. W. Rome, F.S.A., were much admired. A capital collection of books of early date, printed in London, were on view in the Library, where were arranged examples from the presses of Caxton, Wynkyn de Worde, Pynson, John Day, &c. These were lent by Mr. Heath, F.S.A., the President and Governors of Sion College, Messrs. Bernard Quaritch, Talbot, B. Reed, and others, as well as from the Library itself. We noticed, too, some of the manuscripts from the Library, and many of the City Charters from the Corporation archives. The care with which these documents are kept, by the way, affords a great contrast to the careless manner in which some other City records are kept. Mr. Philip Norman's views of Old London are always of interest, and the examples exhibited, although far from being the best examples of our few remaining old houses, yet are of value, and indicate that even the least interesting ones have their depicor. In the Reading Room a good exhibition of manuscripts and letters, with early editions of the works of Shelley, were on view, and were worthy of more attention than perhaps could be rendered to them when so many other objects were on view. The committee did well to arrange in the library a series of books of views of the London antiquities that have passed away. They were examined with interest by the guests. The Archaeological Section of the Institute's meeting was held in the

picture gallery at 9 o'clock. The ancient crypt of the Guildhall, which was to have been thrown open for inspection, was unfortunately obliged to be closed, owing, we believe, to a difficulty with the lighting.

AS stated on another page, the Public Health and Housing Committee of the London County Council, in response to a communication from the Local Government Board, has reported in favour of an alteration in the insanitary and improper "Regulation No. 21," made by the water companies under the Metropolis Water Act, whereby the companies restrict the waste-preventing cistern of water-closets to a discharge of two gallons. This discharge, in cases that have come within our knowledge, has been found actually inadequate to cleanse the pan, with the further danger of insufficient volume of water to ensure carriage to sewer. Added to this, the cisterns sanctioned by some of the London water companies are constructed so that it takes about ten minutes to fill them again, so that any additional flushing at the moment is rendered impossible. It is really difficult to understand by what ignorance or negligence the water-companies have ever been allowed the power of making a restriction so dangerous to the sanitary condition of London, and one which in many instances, we have reason to think, has been illegally but quite rightly ignored. It is monstrous that water companies should ever have been allowed to take such means of checking the expenditure of water. The London County Council has now definitely recommended that the limit of restriction should be altered to a three-gallon flush, and that regulation 21 under the Metropolis Water Act be amended accordingly. We doubt if the limit ought not to be higher than three gallons; but as the Local Government Board are obviously in favour of the alteration, we presume we shall at least get that.

MR. KEKEWICH, the Secretary to the Educational Department, at the opening of some new Board Schools at Brighton a few days ago, made some salutary remarks on the sanitary state of Elementary Schools. Mr. Kekewich is in reality the permanent Minister for Education, and is really more responsible for the working of that department than the political Minister, who changes with each Administration, and who can do little more than attend to the business of the department in the House of Commons, and direct the larger matters of policy. Mr. Kekewich urges strongly the necessity of having elementary schools in a thorough sanitary state, and impresses upon managers that this is one of their first duties. It is quite certain, therefore, that the Education Department will keep a watchful eye on the sanitary state of schools under their charge, and managers who neglect their duty in this respect may expect very little mercy. Apart from the important effect upon the health of children of a wholesome school, attention to this matter has an indirect effect of much value. For it draws local attention to the subject; and it causes the rising generation to acquire some knowledge of proper sanitary states. Children who are accustomed in school to decent sanitary appliances will, as they grow older, look for them in their homes.

MR. JUSTICE BRUCE has recently delivered a considered judgment which is of some importance to persons who purchase building plots. The case was that of *Blake v. Marriage*, and it raised a question on the construction of a covenant in a deed by which the defendant bound himself not to erect on a plot of land anything except private dwelling houses. The rest of the covenant was of the usual character, laying down conditions as to the size of the houses and so forth. The defendant erected a stable

on the land and used it for a time for the horses and carts which he employed in his trade of a builder. He stated in evidence, however, that he intended to build a dwelling-house, and that the stable in question was suitable for such a house. The judge held that it was no breach of the covenant to build a stable before a dwelling-house, but to use it, as was done in the case, was a breach, and for this he gave damages to the amount of 15*l*. The decision is a satisfactory one; it would be hard on a person who really intends to build a dwelling-house if he might not build a stable first if it was convenient. But to allow such stable to be used for trade purposes when no house was yet erected would clearly be to allow the land to be used for purposes for which it was not intended, possibly for an indefinite time.

THE annual report of the condition of the borough of West Hartlepool, drawn up by Mr. J. W. Brown, Borough Surveyor, is very well and completely done, and numerous tables of statistics give very full information on various heads. The death rate (16.80) is below the average of the last nine years, although the population has increased; an indication that the sanitary state of the town is being well attended to. More than 5,000 yards of new front streets have been "declared" in the year, and 2,214 yards of back streets. The past winter "has been a trying one for macadamised roads," but we do not agree with the Surveyor in recommending the introduction of wood pavement on that account. In regard to the clearance of snow, it is suggested that if the various owners of houses would assist in this the first thing in the morning, the work would be much facilitated and the footpaths more comfortable to walk upon. This is what used to be the wholesome rule in London, which our municipal rulers have foolishly given up; with the natural consequences. The Council applied for and obtained a loan of 6,000*l*. during the year for the work required to be done in repairing a great extent of old and deteriorated footpaths; the work on these is in progress. We learn that a great improvement in the state of the sewers has been brought about by the regular employment of two flushing vans. During the cholera scare, large quantities of carbolic acid were used in the flushing vans to aid in purifying the sewers.

IT must be admitted that London came out well on the day of the royal wedding. The line of route of the procession was decorated with an unstinting hand, especially the route to the City, and with very good taste. The red Venetian masts with highly coloured artificial garlands festooned from one to another for miles, and the flags and mottoes hung everywhere across the street, combined to produce that effect of profusion which is such an invaluable element in festal decoration, and which is often more telling than the best and most carefully designed decoration carried out in a more restrained style. Walking along the track of the procession eastward, along Fleet-street and Ludgate-hill, it was difficult to believe oneself in London, so completely had the usually rather dingy aspect of these streets been masked and disguised. From half way along Fleet-street, where the road begins to slope, the appearance of the opposite slope of Ludgate-hill, a mass of moving heads and garlands and waving flags, with St. Paul's rising in the rear, suggested a festive scene out of a grand opera. St. James's-street, with its columns at the ends of the street and its net-work of garlands crossing from side to side, giving the whole street the appearance of a bower, was even better as a foreground effect, but wanted the glory of the long vista which was so effective from Fleet-street. Westward of this, Piccadilly depended more on the decoration of individual houses than on any general scheme of street decoration,

and masts had not been set up, probably from a perception that this kind of decoration demands houses on both sides of the street as a background and support. Some of the houses were very well decorated; but none of them came up in this respect to the Albemarle Hotel, which, as being the corner house nearly facing St. James's-street, was probably felt by its owner to call for some unusual efforts. The effect of the house, draped and festooned by stuffs in very light tints of pink, white, and blue, was admirable; it was by far the best individual effort at decoration which we observed anywhere, and does great credit to the taste and ingenuity of Messrs. V. & G. Jetley, who, we understand, carried it out.

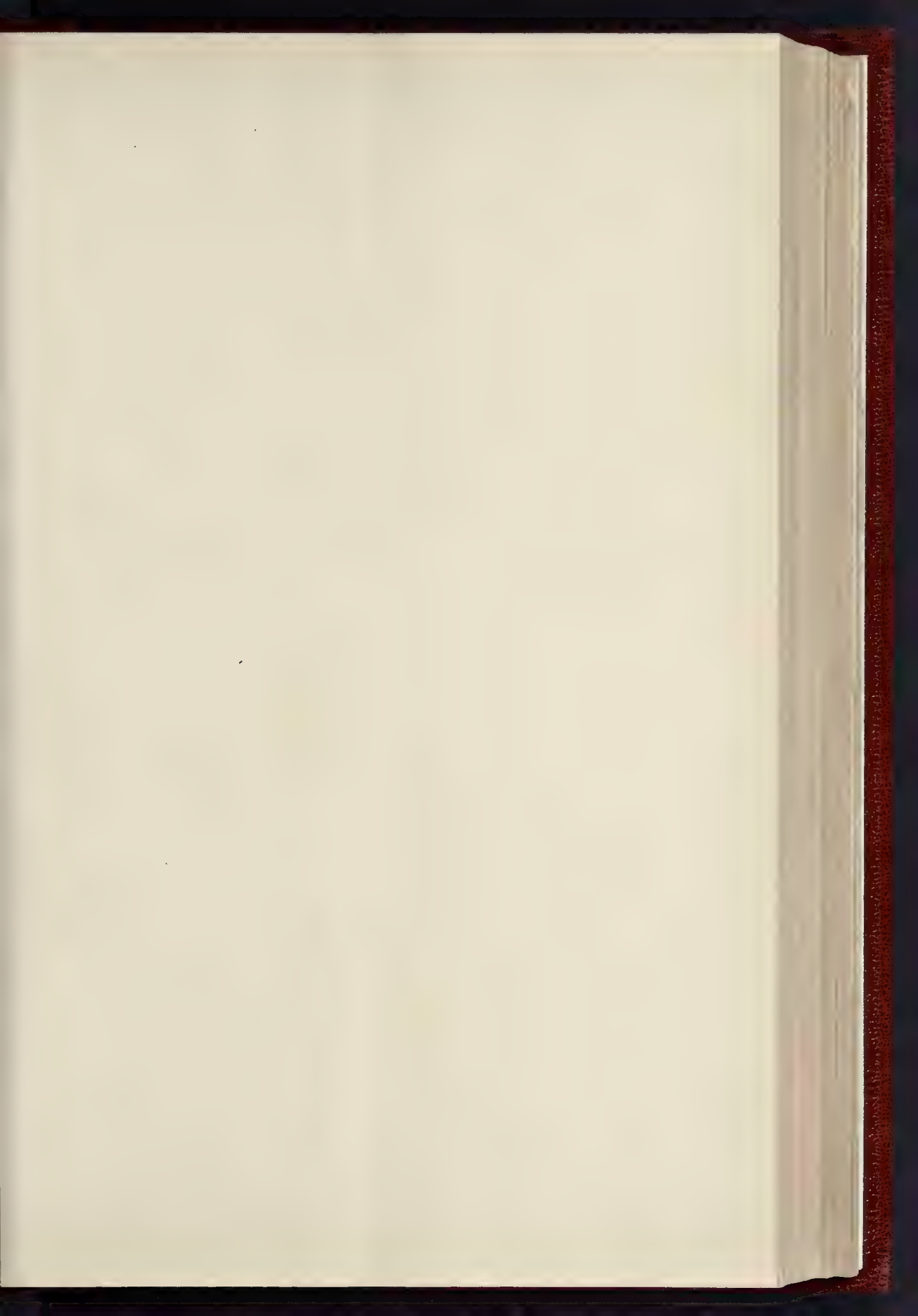
THE NATIONAL WORKMEN'S EXHIBITION.

ALTHOUGH the title of the exhibition of craftsmanship opened by the Prince of Wales in the Agricultural Hall, Islington, on the 1st inst., is somewhat ambitious (as such titles generally are), the "National Workmen's Exhibition of British Skilled Industries" is, on the whole, the best exhibition promoted by working men which we have ever seen. There is an almost entire absence of the amateurish exhibits—many of them fearful and wonderful examples of perverted ingenuity and patience—which we remember to have seen in former workmen's exhibitions. The present is a genuine exhibition of *bona-fide* trade work done by full fledged craftsmen or by apprentices in the trades represented. The exhibitors hail from all parts of England, and also from Scotland and Ireland, and this fact, we suppose, must be taken to justify the use of the word "national." A "national" exhibition in the true sense it is not, either in point of extent or variety, but it may be taken as a fairly representative show, containing a great deal worth seeing, which is very much more than we have been able to say about a great many recent "exhibitions" held in the same building within the last few years.

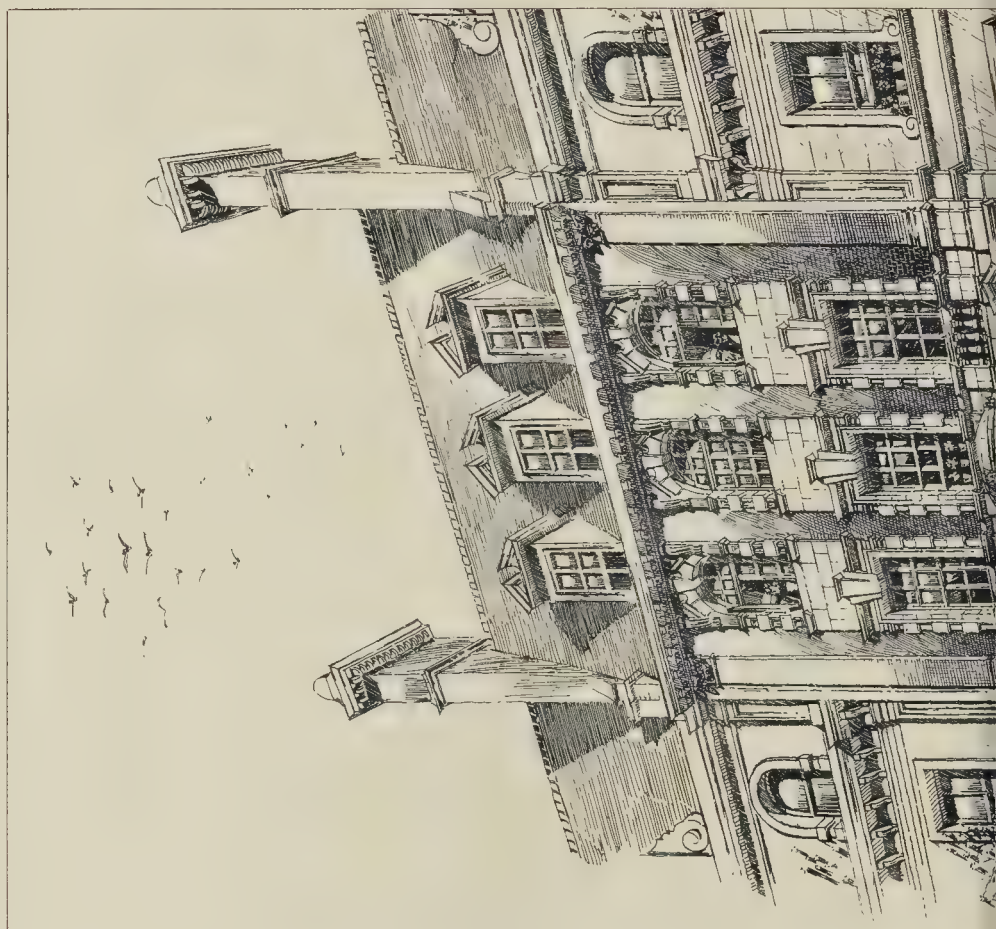
The Exhibition has been promoted by the London Trades' Council, of which Mr. George Shipton is Secretary. He is also acting as Manager and Hon. Secretary of the Exhibition. The Exhibition Committee consists of some fourteen prominent members of leading trade unions, those representing the building trades being Mr. Gregory (Stonemasons), Mr. H. R. Taylor (Bricklayers), and Mr. Shipton himself (Decorators). The Committee have been fortunate in securing substantial financial support from the Corporation of London and from several of the leading City guilds, and a representative Prize Fund Committee has been formed. Very many of the exhibits are shown direct by the workmen themselves, under their own names, and in most of the collective exhibits sent by firms of employers, the names of the workmen are appended. For example, Messrs. W. & F. Thorn, Messrs. Thrupp & Maberley, and other well-known carriage-builders, exhibit carriages of various kinds, and it will be news to a great many people to find that the production of a brougham (let us say) involves the employment by the master "carriage-builder" of men following some nine or ten practically distinct trades, viz., body-maker, carriage-maker, carver, smith, vice-man, spring-maker, trimmer, painter, wheeler, and lamp-maker.

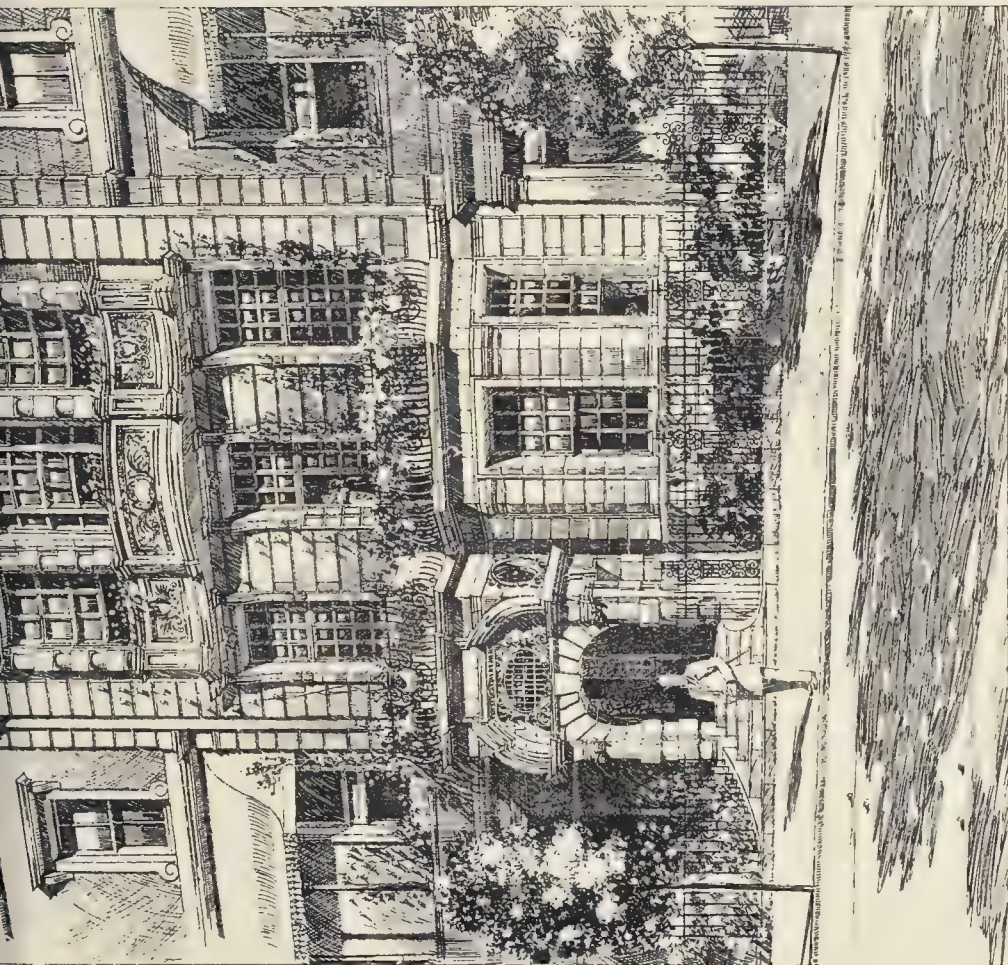
The contents of the Exhibition are arranged in fourteen groups, as follows:—I., The Building Trades; II., Silver Trades, Goldsmiths, Jewellers, &c.; III., Printing and Allied Trades; IV., Leather Trades; V., Clothing Trades; VI., Engineering and Metal Trades; VII., Milling and Baking; VIII., Furnishing, Brush, and Basket Trades; IX., Shipping, &c.; X., Tobacco Trades; XI., Glass and Pottery Trades; XII., Coachmakers, Wheelwrights, &c.; XIII., Textile Trades; XIV., Women's Industries. There is also an interesting collection of exhibits from Woolwich Arsenal and Dockyard.

Group I., the Building Trades, is stronger in plumbers' work than in any other craft. This is no doubt largely due to the impetus given to the technical education of plumbers of late years by the efforts of the Plumbers' Company, under the Master-ship of Mr. George Shaw and the present Lord Mayor of London, Alderman (now Sir) Stuart Knill. Although the exhibits of plumbers' work are, on the whole highly creditable, some of the specimens are evidently mere *tour de force*, and not examples of things likely to come within the



THE BUILDER, JULY 15 1893





HOUSE IN QUEEN'S GATE, SOUTH KENSINGTON.—MR. R. A. BRIGGS, F.R.I.B.A., ARCHITECT.

Royal Academy Exhibition, 1893

range of practical plumbing; they are, indeed, only likely to put the young workman on the wrong track, and are eminently calculated to foster a belief in the minds of people at large that plumbing-work is necessarily complicated. If we see many more of such exhibits we shall begin to share the doubts which we heard expressed by a well-known master builder two or three months ago as to the results of the movement for the technical education of plumbers. We say nothing against the workmanship of these particular exhibits, which as far as we could examine it, appears to be very satisfactory; we merely deem it advisable to protest against the unnecessary and delusive intricacy which characterises them. These remarks, however, are not applicable to the general run of plumbing exhibits, which include a great deal of practical work based on sound principles. In bricklayers' work there has been erected on the floor of the hall a gauged brickwork doorway, the joint work of six members of the Operative Bricklayers' Society. This doorway has been designed by Mr. J. T. Lawrence, architect, and is carried out in the Bracknell red bricks of Messrs. Lawrence & Sons. Another good piece of brickwork is the upper portion of a niche in gauged-work, executed by Mr. C. C. Dille, of Battersea—a student of the Westminster Technical Institute. There are other specimens of brickwork, and a few examples of plasterers' work. Mr. E. Robbins, one of the exhibitors in this section, suggests that something more should be done than is now the case in promoting good plaster-work, and he hints at the formation of technical classes for apprentices and young workmen in the trade. Perhaps the City guilds which are most closely connected with the craft will see to this. In the section devoted to carpenters' work there is nothing very striking, although one or two exhibitors, notably Mr. J. T. Rees, show some good staircase-work. Several forms of safety window-sashes are shown, and Mills's portable election fittings are well worthy of the attention of returning officers and other officials who have to make arrangements for voting by ballot in Parliamentary, County Council, and School Board elections. Masons' work is very poorly represented.

Group II., devoted to the silver trades, goldsmiths, jewellers, &c., is fairly well represented; but the chief attraction is a loan collection, sent by Her Majesty the Queen, of examples of gold and silversmiths' workmanship. These are exhibited in the room known as Berners' Hall, where due provisions for their safe custody are made. The principal object of this collection is the "Military Trophy," in the form of a large centre-piece, the work of Mr. Alfred Gilbert, R.A., who is stated in the catalogue to have been engaged three years upon it. It was a Jubilee gift to the Queen by the officers of the British military forces.

Group III., the Printing and Allied Trades, is rather a large one, and the exhibitors include some well-known firms of printers and lithographers. Chromo-lithography is well represented, and the various processes are very well illustrated. The National Society of Lithographic Artists and Designers exhibit an historical loan collection of designs and reproductions, and they also show what they call an "ideal hoarding," by way of a suggestion for street advertising. The hoarding practically consists in appearance of a dado some 9 ft. or 10 ft. high, with a papered ground of a darkish hue, surmounted by a plainly stencilled border. To the hoarding thus prepared the pictorial and other posters are affixed, with margins of from 18 in. to 2 ft. all round them. By this system of "hanging," a better and less confusing effect is produced than by putting the posters close up to each other, but the effect of the arrangement is largely dependent upon the character of the posters themselves; if these be inherently vulgar and bad in design, the arrangement proposed for them will only accentuate their vulgarity. Paper-hangings are placed in this Group, and not in Group I., and Messrs. Jeffrey & Co. have a very good show of their productions. In the same group is included bookbinders' work, and in this section, amidst much that is commonplace, we must make honourable exception of the exhibit of Messrs. W. T. Morrell & Co., which includes some admirable specimens of delicately-tooled and finished bindings, with the names of the workmen appended to the specimens.

Group IV. is mostly monopolised by the boot and shoe trades. Of this and the other groups named, it is not necessary for us to say anything, except that in Group XIII., Textile Trades, Messrs. Liberty & Co. have a very good display of Spitalfields brocades. In Group XIV.,

Women's Industries, the most notable exhibit is the copy of the Bayeux tapestry made by the Leek School of Needlework under the superintendence of Mrs. Wardle. Useful guide-books affording a key to the incidents represented by the tapestry are provided for the information of visitors. This exhibit, we may add, is upstairs in the gallery at the Islington Green end of the Hall. These capacious galleries, let us add, are well filled with exhibits, and their present condition is a pleasing contrast to the dreary and forsaken aspect which they wear during most other exhibitions held in the building.

The Exhibition, we understand, is to remain open until Saturday, August 12.

ROYAL COMMISSION ON METROPOLITAN WATER SUPPLY.

As already reported,* the Royal Commission finally concluded its inquiry by examining Dr. F. W. Barry, one of the Inspectors of the Local Government Board, upon his official reports attributing epidemics of enteric fever in Stockton and Middlesbrough and other places in the Tees Valley to the flood water of the Tees, having previously examined Mr. Wilson, the manager of the Water Board, who impeached Dr. Barry's conclusions, and attributed the fever to local insanitary conditions. Dr. Barry stated that this was one of the first cases in which the alleged conveyance of enteric fever on a large scale by a filtered water supply had been made the subject of exhaustive investigation; and, as the reports were adverse to the water supply or the filtration, the case had a direct bearing on the main problem before the Commission. It is impossible to state concisely the topographical and statistical elements of the controversy between Dr. Barry and Mr. Wilson, which was opened for the public by Mr. Wilson's defence of the water, and closed by the rejoinder of Dr. Barry, whose final report is still unpublished. The broad facts of the case are that the flood water of the Tees is exceptionally polluted, that it rapidly fouls the filters, that it is probably filtered imperfectly, as bacteriological examination indicates, that it is distributed in localities where insanitary conditions prevail; and, in epidemics of fever, drinkers of Tees water suffered more than others. In these circumstances, all concerned in questions of water supply will read with interest a summary of the evidence of

Dr. Barry on the Tees Epidemics.

Dr. Barry had been one of the inspectors of the Local Government Board for more than ten years. He was constantly making inquiries, but he had not previously made any on so large a scale as this as regards enteric fever. He regarded his report as establishing the strongest possible presumption, short of absolute proof (complete demonstration being hardly to be looked for in the present state of our knowledge) that the Tees water was the cause of the exceptional prevalence of, and mortality from, enteric fever. Mr. Wilson claimed to have shown that, whatever was the cause of the epidemic, it was not Tees water; but he had done nothing of the kind. His contentions were based on evidence of the negative class, and for the most part he had touched only the fringe of the great body of facts dealt with in the final report. If the Commission thought the conclusions of the report were invalidated by Mr. Wilson, he asked to be allowed to comment on Mr. Wilson's evidence, and he also asked for some days for marshalling his comments in due order, proportion, and sequence.

The Chairman could not state the conclusion the Commission would come to, because they had carefully avoided considering the subject and they could not hold any further sitting to take evidence, because they were obliged to report before the summer recess. It was the main general conclusions they would chiefly consider, and they could not investigate whether this or that case of fever was due to this or that cause.

Dr. Barry made some corrections in the proof of his final report, which the Commission had. In his interim report he had said the exceptional incidence of attack had been almost entirely confined to the users of Tees water, that in the larger districts the house attack rates were almost absolutely uniform, and that the rates proved the exceptional prevalence of the disease to have been fairly uniform. For "uniform distribution" he wished to substitute "universality of distribution." The tables showed the rates were not absolutely uniform; it was uni-

versality of attack and uniformity of incidence. Later investigations had not changed his opinion, as regarded uniformity of exceptional incidence, but uniformity had been misunderstood as implying mathematical uniformity. There was a nearly uniform excessive incidence of disease. In his inquiry he proceeded by the process of exclusion, dismissing various common agencies for the dissemination of enteric fever. Then he found that in the ten sanitary districts under review, in which an excessive incidence of enteric fever occurred in the two periods of six weeks in question, there did exist a community of circumstances to a large extent as regards water-supply, whereas, in respect of any of the other commonplace conditions, which have been elsewhere convicted of disseminating enteric fever, they differed *inter se* in all variety of ways. Putting aside two or three instances in which the numbers were so small as to give unreliable rates, the subdivision of the districts sufficed to demonstrate the exceptional incidence of enteric fever attack as practically confined to the users of Tees water.

The Chairman: It only amounts to "practically."

Dr. Barry: As I have said, you could not, in the present state of our knowledge, do more than establish a strong presumption.

The Chairman: To attribute an outbreak of typhoid to water it would have to be confined to the users of that water.

Dr. Barry: The exceptional incidence would have to be so confined.

The Chairman: And it would have to be practically simultaneous in its outbreak, and practically uniform amongst the consumers of the water; not mathematically uniform, but nearly uniform?

Dr. Barry: "Nearly uniform" I think one might accept. You could not be certain that large portions of a water area might not escape.

The Chairman: But why, if they drank the water, should they escape?

Dr. Barry: As far as we know, the matter of enteric fever is particulate; it is not diffused equally. Some districts might receive a large quantity; others escape. That has been noticed over and over again.

The Chairman: It comes so much to be a question of degree. I can understand one house escaping, but not 150, or even 100.

Dr. Barry: It is also a question of the amount of poison or the amount of the infective matter. You may have it extremely diffused, and in a waterworks it would be so; but then that is just all the more reason why many houses should escape if there is only a small amount of infective matter.

The Chairman: But if groups of 150 or 50 houses escape, does not that raise a presumption that the cause of the disease has not been uniformly distributed?

Dr. Barry: You cannot have uniformity where you are dealing with a particulate infection.

As far as our knowledge goes, he continued, typhoid is not spread unless there has been a previous case, but the primary case cannot always be found. He could not form any notion how many cases in the Upper Tees valley could furnish a sufficient amount of specific material to do this damage. But in the Caterham case the excreta from one person caused a large outbreak.

The Chairman: Which is the most reliable factor for consideration—the number of cases or the number of deaths?

Dr. Barry: Where you can get the number of attacks they give the most valuable information as to the period of exceptional incidence. It is much more valuable than the mortality, because that follows at a very varying period after the attack. The percentage of deaths to cases varies very much under different circumstances; and in a large epidemic it is less than where you have a few cases.

The Chairman gave the averages for the Metropolis, the London Fever Hospital, and the Metropolitan Asylums Board's Hospitals, and asked whether 18 per cent. would be a fair average.

Dr. Barry put the mortality in epidemics at 10 per cent.

Dr. Ogle: Why is it lower in epidemics?

Dr. Barry: Perhaps more cases of attack are noticed.

The Chairman called attention to tables showing two ratios, one of 12 and one of 35 per cent., and said they raised a presumption that 35 (Tees water districts) was larger than it ought to be, and 12 (non-Tees water districts) was smaller than it ought to be.

Dr. Barry admitted that too many cases might have been returned in one instance and too few in the other; but there was also this disturbing

* See *Builder* for last week and for June 24.

element—residents in non-Tees districts got the water when at business or work.

Discussing other tables, the Chairman invited the witness to break down the impression that the figures of attack as between drinkers and non-drinkers were fallacious.

Dr. Barry admitted that they were so to some extent. There was a large amount of enteric fever outside the Tees districts, but nothing like the amount inside those districts.

Questioned as to the dissemination of disease by Tees water long after the floods, Dr. Barry held that the pollution in the reservoirs would not pass off at once, but would continue to contaminate the supply, as it did at Bangor.

Dealing with the rural sanitary and also the urban districts of Stockton and Darlington, in both of which there is compulsory notification, and separating the districts supplied with Tees water from those not so supplied, Dr. Barry had compiled tables which furnished the following results, in reported cases of typhoid fever, for four different periods:—

Rural Sanitary Districts.

	Tees.	Non-Tees.
Population	8,991	14,422
1. Cases (16 months)	143	19
Ratios per 10,000	159	13
2. Cases (3 months)	80	9
Ratios	89	6
3. Cases (6 weeks)	50	6
Ratios	55.0	4.2
4. Cases (6 weeks)	30	3
Ratios	33.4	2.1

Urban Districts.

	Tees.	Non-Tees.
Population	59,446	2,646
1. Cases (16 months)	479	8
Ratios per 10,000	80.5	30.2
2. Cases (3 months)	391	0
Ratios	51	2.3
3. Cases (6 weeks)	203	0
Ratios	34.1	22.7
4. Cases (6 weeks)	101	0
Ratio	17	0

The rates would have been lower in the non-Tees districts if the cases known to have been imported from the Tees districts had been taken out. The two periods of six weeks end respectively on October 18, 1890, and February 7, 1891. A fallacy to be guarded against in dealing with the urban districts is that you have a mingling of people receiving two supplies with access to both. Making every allowance, Dr. Barry said there was a distinct difference between the two sets of districts, although it was not so striking in the urban as in the rural districts. In the Darlington district there were agricultural and other villages, the populations of which were living under the same conditions, and only where the villages were supplied with Tees water was there any epidemic prevalence. He had reported fully upon the sanitary condition, housing, and industries of all the places embraced in the report. Ancient Stockton was not so densely populated as other parts of the town.

To Mr. Mansergh Dr. Barry said that in the Bangor case there was neither subsidence nor filtration. The filter was found to be in a fearful condition, not having been cleaned out for years.

To Professor Dewar Dr. Barry said he had not obtained health statistics of the Tees Valley for non-epidemic periods. In the main the rural population was non-Tees drinking, and there was a mean proportion of about 4 to 1 of deaths in the urban as compared with deaths in the rural districts. It was to the unusual condition of the river in floods he attributed the outbreaks. Under ordinary conditions the water might be unimpeachable chemically. The filtration was "very much the ordinary filtration"; some places had better filtration. Professor Dewar pointed out that, according to the bacteriological tests embodied in the report, the filtration left in the water about one-eighth or 15 per cent. of the microbes found in unfiltered river water, while in London filtration removed 98 or 99 per cent. Dr. Barry could not explain this, but thought it indicated some anomaly in the filtration. He could hear of no more than two cases of enteric fever early in 1890 above the intakes, and these were at Coniscliffe, half a mile from the intakes; and he would not refer the epidemic to them. One bad flood would be more pernicious than succeeding floods; and floods might be harmless if the specific material of fever was not in the river to be washed down.

Asked whether the presumption that the infection of the water in August was still operative in October was compatible with scientific facts as to the life of the typhoid organism, he

replied it was not with regard to the organism as treated in the laboratory, but our knowledge was incomplete, and we did not know whether that organism was really the cause of typhoid fever. If it were proved that one form of organism could not be kept alive under certain conditions of light and air, we did not know that there was not some other form which might convey the disease. He did not suggest where it lived, whether in the pipes or the filters. Whatever it was that caused typhoid fever in this case, there was a strong presumption that it was remaining in the water. It was supposed to be something living, but that was not proved at all.

Professor Dewar asked whether there was any other case in which the water of a river flowing rapidly for seventeen miles, aerated and filtered, had conveyed epidemic disease.

Dr. Barry believed this was the first case on record in which it had been done on a large scale.

Professor Dewar: And if you substantiate this it must be due to the fact that the filtration is not properly conducted?

Dr. Barry: That the organism, whatever it is, can get through the filters.

Professor Dewar: That the filtration must not be properly conducted.

Dr. Barry: That is supposing that by perfect filtration you can stop everything and prevent anything whatever getting through.

Professor Dewar referred to the case of Hamburg, whose water supply when filtered produced no disease, mentioning that Dr. Koch had ordered that it should be treated in the same way as London water, arriving at this conclusion by rigid experiments.

Dr. Barry understood Dr. Koch also to say there would always be cases in which he could not stop all the infective matter, either of cholera or of enteric fever.

Professor Dewar: That, of course, depends upon the efficiency of the filtration and the life of the organism. There are instances of double filtration, so that if the first is not satisfactory you can have a second. If it be substantiated that this case arose from bad water supply in an abnormal condition of the river, it was due to bad filtration?

Dr. Barry: Due to not perfect filtration.

The generally insanitary condition of the Tees area was admitted by Dr. Barry. He did not say that all the fever was due to the water supply; there was a certain amount of fever normally in the district. There had been deaths from enteric fever for years past in all these districts. Having got in, it was quite possible it had spread, owing to insanitary conditions in certain selected areas. Local Government Board Inspectors had condemned the sanitary arrangements of some urban districts, and, if they had visited all, they would have condemned those of nearly every populous place in the area.

With regard to an enquiry which he made in June, 1890, he was supposed to have attributed an epidemic of that year to insanitary conditions because of certain recommendations he made to the local authorities; but he sent a memorandum to the Local Government Board, which had never been published, and this he now read. This set forth that the one conspicuous condition common to the whole of the large infected area was water supply; and he recommended an inspection of the river such as had been made of the River Ure. He remarked: "For the present the unusual prevalence of enteric fever is at an end; but there is the possibility of a recrudescence of it." He mentioned that, for Stockton and Middlesbrough, works were in process of construction at the head of the Tees Valley for the collection of water from a gathering ground practically free from chance of pollution; and they were then (in 1890) expected to be completed in about three years. But Darlington would still draw from the Tees. Practically he attributed the outbreak of 1890 to water; and it was probable that former outbreaks had to be attributed to it. There was an enormous outbreak in 1874-5-6, and a large mortality from typhoid fever in Middlesbrough, probably due to the same cause; but at that time the Local Government Board made no inquiries. No mention was made of water in his suggestions to the authorities of 1890 because of the statement that the new works were being pushed forward, and the Local Government Board thought it inexpedient to frighten people by putting pressure on the Water Board.

Sir G. Bruce: Then you found a good many insanitary conditions in the district?

Dr. Barry: Certainly; I should do anywhere in that part of the country. You could not send me to any district, I think, in the North of

England where I should not find a great many insanitary conditions.

The Chairman: Do you think that places which in theory and by examination and enquiry seem to a scientific medical officer to be the most unhealthy are always the most unhealthy in practice?

Dr. Barry: I am afraid that is a question I am not prepared to answer.

The Chairman: That absolutely concludes our inquiry, and we shall do our best to report before separating for the usual autumn holiday.

ARCHITECTURAL ASSOCIATION SUMMER VISITS:

BUSHEY.

ON Saturday last a large number of members of the Architectural Association went to Bushey, attracted by the opportunity of seeing the house which Professor Herkomer, R.A., is building for himself, and which is now approaching completion. Mr. Herkomer met the visitors and conducted them over the works, of which he has himself been both architect and builder, save that the composition of the exterior was designed by Richardson, the American. This, therefore, in its main lines and grouping shows the boldness and picturesqueness for which that famous architect's work is noted. The details, Mr. Herkomer explained, were not worked out by Mr. Richardson, and we look in vain for that peculiar combination of vigour and delicacy, particularly in the carving, which the deceased architect knew so well how to contrast with the ruggedness of texture that he gave to his wall surface. The greater part of the exterior is faced with tufa stone specially brought from Mr. Herkomer's native Bavaria, relief being obtained by a free use of red sandstone. A notable point in the exterior treatment is the small size and great depth of the window openings, due partly, no doubt, to Mr. Richardson's love of wall, and partly to Mr. Herkomer's desire to feel the sense of being indoors when at home in his new house. The studio is, of course, an exception in this respect, being well lighted, not only by large windows, but also by immense skylights.

Internally, the house will show Mr. Herkomer's hereditary love of wood-work; walls and ceilings, as well as floors, are, in nearly every instance, finished with wood, panelled and carved. In the dining-room, American red-wood is largely used, both for beams and panelling of ceiling, and for the walls. In the drawing-room, oak is principally employed. In both of these rooms the wood wainscoting of the walls is to receive, in addition, decorative figure subjects, executed by Mr. Herkomer, in low relief modelling and coloured. The detail and carving of the interior is based upon late German work, and has been largely executed by Mr. Herkomer's father, uncle, and nephew. Wrought metal work, principally in iron and copper, and of elaborate detail, is also occasionally introduced. The panelling of the bedrooms is to be carried out in pine, carved in low relief. The house, when complete, will be unique, and will reflect the versatility, as well as the idiosyncrasy of the owner, to an extent that is almost unparalleled.

After inspecting the elaborate and costly house of the great artist, the members visited the quiet and unpretentious home of one of his pupils, known as Bournemead, designed by Mr. J. M. Brydon, and illustrated in the *Builder* of May 20 last. Red brick and tile and white wood-work, with simple detail, make up the pleasing exterior. Internally there is little beyond what one would usually find in an artistic but modest small house and studio, where money has not been lavishly expended, but thought has not been stinted. A greater contrast than that between the homes of master and pupil could hardly be conceived.

COMPETITIONS.

NEW TECHNICAL SCHOOL FOR BIRMINGHAM.—The plans for the new municipal Technical School for Birmingham have been accepted. In order to assist the Technical Schools Committee in their determination, Mr. J. Murgatroyd, F.R.I.B.A., of Manchester, was called in as assessor, and he has reported in favour of the plans submitted by Messrs. Essex, Nicol, and Goodman, of Newhall-street, Birmingham. Altogether nineteen architects were invited to compete, of whom thirteen sent in designs. A premium of 100l. will be awarded to the successful competitors. Messrs. Martin and Chamberlain (No. 11) were awarded the second

premium of 60*l.*, and the third premium of 40*l.* fell to Mr. W. Henman, the architect for the new General Hospital, whilst an extra premium of a similar amount was granted to Mr. Daniel Arkell. The elevation to Suffolk-street of the selected design is in the English Renaissance style. The outer walls are to be built with brick, with pressed facings and terra-cotta dressings, cornices, mullions, and mouldings. The estimates as originally framed were for 40,000*l.*, but the plans prepared by Messrs. Essex, Nicol, and Goodman represent an expenditure of about 8,000*l.* more than this sum. This is exclusive of the cost of technical appliances and plant.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday afternoon last at Spring-gardens, the Chairman, Mr. John Hutton, presiding.

Finance: The Issue of New Stock.—The Finance Committee, in their report, stated that in accordance with the resolution of the Council of June 27, tenders in respect of the 1,500,000*l.* Metropolitan Consolidated 2½ per cent. stock, were opened by the Chairman of the Council at the Bank of England on July 4. The tenders amounted to 1,851,270*l.*; they ranged from 93*l.* to the minimum of 89*l.*; persons tendering at 89*l.* 16*s.* 6*d.* will receive about 76 per cent. of their tenders, and those above that price in full. The average price realised was 90*l.* 1*s.* 1*d.* The amount of cash receivable by the Council in respect of this issue of stock is 1,350,859*l.*

The report was received.

The Water Question.—The General Purposes Committee presented the following report and recommendation:—

"The Special Water Committee have communicated to us a resolution expressing the opinion that the Committee should now be recognised as a standing committee of the Council. As it appears to us that it will always be necessary for the Council to have a committee to consider questions relating to the water supply of London, we think that the Committee appointed for this purpose should be a standing committee. We recommend—

"That the Water Committee, which has hitherto been classed as a special committee, be for the future one of the standing committees of the Council."

The recommendation was agreed to.

Later on, the following report and recommendations of the Special Water Committee were presented:—

"Supply of Water.—In compliance with the reference made to us, we are considering the steps to be taken by the Council for acquiring the undertakings of the water companies now supplying London, or for providing a new supply. We now have before us an important report by the Chief Engineer on certain areas from which it has been suggested that a considerable quantity of water could be obtained; but before we can express a definite opinion on the practicability of adopting this suggestion it is necessary that he should have the assistance of geological experts in certain investigations which we consider desirable. We accordingly recommend—

"That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, we be authorised to incur an expenditure not exceeding 500*l.* in employing geological experts to assist the Chief Engineer in investigating sources of water supply."

Water Companies' Accounts.—It seems to us expedient, having regard to the possibility of a decision to purchase the undertakings of the companies, that the Council should be acquainted with the financial affairs of the companies, in order to safeguard the interests of the ratepayers should the question of the amount to be paid be referred to arbitration. We have caused the published accounts of one company to be examined by a financial expert, who has made a report thereon, and we are of opinion that the accounts of the remaining seven companies should be similarly dealt with. We therefore recommend—

"That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, we be authorised to incur an expenditure of 500*l.* for the purpose of obtaining a report on the accounts of the London water companies."

These recommendations were agreed to, after some discussion.

Paddington Recreation Ground.—The Parks and Open Spaces Committee presented the following report on this subject:—

"This question originally came before us in the form of an application for the Council to contribute the sum of 50,000*l.* or 60,000*l.*, being the whole purchase money believed to be required for the acquisition of about twenty-five acres adjoining the Paddington Recreation-ground, then in private hands, but for which an Act of Parliament has just

been passed vesting it in the Vestry of Paddington, who are not only to acquire but to control and maintain it.

We could not entertain this proposal, as the Council has never contributed the whole of the purchase money for any open space. We were then urged to contribute the purchase money for nearly three acres adjoining the recreation-ground, and from the plans placed before the Council it is apparent that the addition would be valuable.

The whole of the purchase money for the present recreation-ground has been obtained—25,000*l.* from Paddington Vestry, 13,000*l.* from other local bodies, and over 13,000*l.* from private subscribers, including 2,000*l.* and 1,000*l.* generously given by two of the members of the Council.

The Act of Parliament obtained by the Vestry of Paddington provides for the place being open free to the public, with a certain portion reserved for games, for which the various clubs may be asked to pay small annual rents.

The Council has in several instances contributed to open spaces over which the local authority has entire control. The new feature in this case is that the Council is asked to contribute towards the acquisition of an open space, in respect of part of which charges may be made for the playing of cricket and other games.

This is perfectly true, but we would ask the Council to consider the following facts. The recreation-ground now is complete, the additional three acres are suggested as an improvement, and the Act provides that at least four acres, exclusive of roads, shall always be unappropriated. The Vestry further agrees that two of the representatives of the Council for the district shall be on the committee of management.

At the present time only 150 yards of the recreation ground front on a public road. If the proposed addition is made to the ground, over 500 yards will abut on a road 50 ft. in width.

The district of Paddington has few open spaces, and as this place will be available for the public at all times, and four acres will always be unappropriated for games, we have, after much consideration, decided to recommend—

"That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the Council do contribute a sum not exceeding 6,000*l.* towards the purchase of the 2*a.* 2*r.* 17*p.* of land adjoining Paddington Recreation Ground, which is under the control of the Vestry of Paddington, for the purpose of adding it to the Recreation Ground, conditionally on the Vestry giving an undertaking in terms to be approved by the Solicitor that two members of the Council representing the division shall be members of the committee of management."

An amendment (moved by Mr. Hubbard, and seconded by Colonel Ford), limiting the amount of the Council's contribution to 2,000*l.*, was rejected by a large majority, and the recommendation of the Committee was agreed to.

Highgate Archway.—The Highways Committee presented a report respecting the proposed widening of Archway-road, Holloway, and the reconstruction of Highgate Archway. They recommended—

"That powers be sought in the next session of Parliament to enable the Council to widen Archway-road and to reconstruct the Highgate Archway, as shown upon the plan submitted with the report, and providing also that the cost of the work, estimated at 27,000*l.*, shall, after deduction of the sum of 1,000*l.* to be contributed by the Ecclesiastical Commissioners, be borne in equal proportions by the Council, the Middlesex County Council, the Vestry of Islington, and the Hornsey Local Board."

The recommendation was unanimously agreed to.

The Shaftesbury Memorial Fountain.—The Improvements Committee presented the following report:—

"We have to report that the Shaftesbury Memorial Fountain at Piccadilly-circus was unveiled and handed over to the Council by the Duke of Westminster on June 29 last, and that we are making the necessary arrangements for the maintenance and periodical cleansing of the structure. We may add that Mr. Alfred Gilbert, the designer of the fountain, has submitted several suggestions for the improvement of the fountain, and especially for preventing the sprays of water being blown on to the public way. We will report upon these suggestions in due course."

Mr. Beresford Hope asked who was responsible for the design of the winged figure at the top of the fountain? And what did it represent?

Mr. Moss sought to know whether the Memorial Committee or the sculptor would defray the cost of the proposed improvement of the fountain?

Mr. Hollington, the Chairman of the Improvements Committee, said he was quite unable to answer Mr. Beresford Hope's questions. In reply to Mr. Moss, he said that Mr. Alfred Gilbert would make the alterations referred to at his own cost.

The Crossness Sewage Outfall: Liming Station.—The Report of the Main Drainage Committee contained the following:—

"Our attention has been called to the desirability of making some alterations to the lime-mixing machinery at the Crossness outfall, and the Engineer has suggested that for the mills now in use at the liming station there should be substituted three wash mills or mixing pans similar to those in use at the Barking outfall, but of a smaller size. He has submitted to us a plan showing how these pans can be arranged, and also an offer by Messrs. Clayton, Howlett, & Co., to supply and fix them for the sum of 475*l.*

To enable the pans to be used certain alterations to the buildings will also be necessary. These alterations, which are estimated to cost about 475*l.*, could, we think, be carried out by the Works department, and, in the event of the Council agreeing to the suggested arrangement, we will have the plans and specifications prepared and submitted to the Council. The Chemist has also suggested that some stirrers should be placed in the lime-water tanks to provide for the more thorough solution of the lime in the water, and for this purpose it has been proposed that one of Gabbett's patent mixers should be fixed for trial in one of the tanks. This can be obtained complete for the sum of 162*l.* 10*s.*, but in addition to this some expenditure will have to be incurred in erecting it. The Engineer has also laid before us a design for a traversing agitator to be placed in one of the tanks; it being deemed advisable that one only should be erected in the first instance, so that its efficiency may be fully tested before incurring the larger expenditure for the whole seven tanks. We have given the above proposals very careful consideration, and having ourselves inspected the present process of lime mixing at this station we think it very desirable that these alterations should be made. The total cost of the machinery and alterations will probably not exceed 1,500*l.*, and we recommend—

"That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the Council do sanction an expenditure of 1,500*l.* for the erection of new machinery, alterations to buildings, and other incidental works at the liming station at the Crossness outfall works."

The recommendation was agreed to.

Waterloo Bridge.—The Bridges Committee reported as follows as to the repaving and cleansing of the carriageway of this bridge:—

"We have further considered the question of repaving the carriageway of Waterloo Bridge at the same level as the existing road. With regard to the material to be used, the estimated cost of laying creosoted deal blocks, which would last about six years, is 2,240*l.* The estimated cost of laying Jarrah wood amounts to 3,660*l.*, and this would probably last about ten years. The estimated cost of taking up, re-dressing, and re-laying the granite carriageway, including quarter new stones, is 3,000*l.* This would also last ten years. The use of Jarrah wood is still somewhat in an experimental stage, and, consequently its length of life is uncertain. Seeing, also, that the local authorities have laid creosoted deal blocks on the approaches on both sides of the bridge, we think that under all the circumstances creosoted deal blocks would be the best for the purpose. We recommend—

"(a) That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the carriageway of Waterloo Bridge be repaved with creosoted deal blocks at an estimated cost of 2,240*l.*"

We propose, for the periodical washing of the road and parapets of the bridge and the watering of the carriageway in dry weather, that two lines of galvanised iron water service pipes 2 in. in diameter should be laid under the carriageway, connected with ten hydrant chambers to be formed in the footways. These hydrants, if fixed about 280 ft. apart, would enable the road and parapets to be rapidly cleaned and watered. The estimated cost of supplying and laying the service pipes, connecting the same with ten hydrants, and supplying four lengths of hose with a hand-truck for the conveyance of the hose and spanners, is 546*l.* We recommend—

"(b) That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, water service pipes, 2 in. in diameter, be laid under the carriageway of Waterloo Bridge; that ten hydrants be fixed in the footways, and that the necessary hose and appliances be obtained, at a total estimated cost of 546*l.*"

We further recommend—

"(c) That the whole of the work be executed by the Council without the intervention of a contractor, and that the specification, drawings, and estimates be referred to the Works Committee for that purpose."

Some discussion ensued on recommendations a and b, it being urged that a wooden pavement to a granite bridge would be incongruous, and, moreover, unnecessary, as there were no houses bordering the bridge, and the prevention of noise was no particular object. If wood paving was to be used, it was asked, why not use Jarrah? On the question of cost of wood paving as compared with granite setts, Mr. Emden asserted that he had the authority of the Surveyor to the Strand District Board of Works for the statement that wood-paving in that district was found to be very much more economical than granite, and he believed that was the experience of Colonel Haywood, the Engineer to the City Commissioners of Sewers.

The recommendations were ultimately agreed to, and the Council having transacted other business (having, in fact, disposed of the whole of the twenty pages of reports on the agenda, as well as of the notices of motion), adjourned at 4.20, an unprecedentedly early hour under such circumstances.

Illustrations.

INTERIOR, GROCERS' HALL.

THIS is a view of the interior of the new Hall for the Grocers' Company, as carried out from the designs of their architect, Mr. H. C. Boyes. The Hall, as will be seen, is Classic in style, and an old precedent is followed in the dividing off of a portion of the end of the room by a screen between the columns, so as to form a vestibule.

The Hall is 96 ft. long, and 42 ft. wide. The panelling is of oak, and the wrought-iron work of the screen is carried out by Mr. Starkie Gardner. Messrs. Cubitt & Co. were the builders.

We are unable to give the plan at present, but may give it in a future number, along with another illustration.

IGHTHAM MOTE, KENT.

We publish this week some drawings from the pen of Major-General C. E. Luard, illustrating portions of perhaps the most remarkable Mediaeval residence in this country. For the following remarks also we are indebted to General Luard, who has had special opportunities of becoming well acquainted with every detail of the ancient house:—

"The Mote lies at the mouth of a narrow and beautifully wooded gorge in the cliff of greensand which forms the north escarpment of the Weald of Kent. The arms of this gorge are in Dinas Dene and in the hamlet of Toythatch, and down the former flows the little perennial stream which, after passing through a pond (formerly a string of ponds) and under the bowling-green, is discharged into the moat surrounding the house. High grass slopes and terraces flank on either side this acre of velvet, at the north end of which stand two noble cedars, while at the south-west corner of the pond above it a splendid specimen of the silver fir, 112 ft. high and 13 ft. in girth, mourns the loss by lightning of its fellow which stood at the south-east angle of the same pond.

As is the case at Hever and Leeds castles, in the same county, the moat entirely surrounds and washes the walls; but at Ightham Mote the sharp fall of the ground above and below the house produces a far more rapid flow of water than is possible at either of those places, and the suspicion of dampness attaching to a house so situated may be discarded; in fact, the condition of books and papers there amply disproves it.

It has been supposed by many persons that there is an intimate connexion between the name of this house and the moat which surrounds it, but the reason for this assumption appears to be based on insufficient grounds. The De Hauts, who are believed to have been the first owners of the property in the reign of Henry II., were also lords of the district, and the house would probably have been erected on the site of the Wittenage Mote, or place for the periodical meetings of the Council of the District. It is very probable that the name of Mote* was thus derived, for the surrounding of a place of importance with a moat was a common enough circumstance in those times of insecurity, and quite an insufficient cause for nomenclature.

The moat is nearly rectangular and nearly square, averaging 58 yds. by 55 yds. on the outside, with a breadth varying from 16 ft. at the N.E. corner to 32 ft. at the S.E., and varying from 3 to 10 ft. in depth. The nearly quadrangular house which it surrounds has an external uniform length from east to west of 126 ft., with an average width of 112 ft. from north to south, and encloses an open quadrangle or patio 76 ft. by 53 ft. The moat is crossed by three bridges, that on the west (of ragstone in two segmental arches) leading to the main entrance, a massive Tudor double gate with wicket,† the framing being in high relief, moulded and nail-studded, and with linen-roll panels. Over this gateway, and between the first and second floor windows, are carved on a decayed stone panel the arms of the family of Selby, in whose hands the property was held for three centuries. The panel is set in the face of a square three-storied tower of ragstone, topped

* In a map of Kent, Sussex (spelled Southsex) and Middlesex, now at Barham Court, near Waterbury, Kent, the place is marked as Mote. The date of the map is 1575.

† See illustration in Parker's Domestic Architecture, Vol. III., Part II.

with stone-dressed brick battlements. The south side of the upper story is also faced with brick, possibly a repair due to weather affecting the stone face on that, the exposed side. There is no actual historical evidence of the date of erection of this tower, and, in fact, when the Royal Archaeological Society visited the Mote in 1863, the late Major Luard Selby, an experienced archaeologist, admitted in the account which he then read that the dates of erection of the various parts of the house must, to a great extent, be guessed at, as very little historical evidence existed by means of which accurate dates could be assigned. The names of its proprietors for the last seven hundred years or so, and the periods for which they owned the property, are known with a fairly sufficient accuracy, but not so their works.

It is rather too much the case to assume that a house, or a portion of a house, must have been erected at a specific date because the windows or doorways, or some of them, belong to that date; and again, that if a certain window or doorway corresponds to the work of a particular period, it was consequently executed at that period. Such conclusions are very apt to be arrived at without sufficiently considering, in the first place, that stone, especially much of that used for windows, wears out, and has periodically to be renewed; and secondly, that after making every allowance for what is termed fashion, and for the varying humours of men as regards good taste and had taste, good proportion and bad, there must have been some architects or masons, and more especially Freemasons, in Mediaeval times, who would frequently prefer to reproduce old designs rather than have to make new ones or copy those of their own age. The effect of this, in the absence of actual historical record, would be to give an exaggerated antiquity to work so treated, and we are convinced that errors of this kind, which conveniently agree with the prevailing taste, are frequently perpetrated. The case of the Mote, then, is one which has to be treated with extreme care, for architectural irregularities and a want of uniformity, giving, indeed, a peculiarly subtle charm to the whole pile, are its prevailing characteristics.

One test which has been applied for determining the dates of erection or alteration of certain parts of this old house is ingenious, if not very conclusive; it consists in noting the dates on which the property changed hands, the theory being that a new owner is rarely satisfied until he has demolished, altered, or restored parts of his new possession in some particular or other, and occasionally to a very considerable extent. There is something in this, and it is well, therefore, to keep such points in the mind whilst with the eye you survey the work as it stands. We therefore, before proceeding further, give in a tabulated form this chronological information, so far as it is known and for so much as it may be worth, as a key or clue to the dates of the various parts of the house:—

Family.	Name of Owner.	Date.	Reign.	Remarks.
De Haut	Ivo or Sir Ivo	c. 1180	Henry II. ...	—
"	Sir Piers (Fitz Haut)	c. 1240	Henry III. ...	Steward of the King's Household.
Cawne or Couen ...	Sir Thomas	c. 1340	Edward III. ...	Buried at Ightham, and supposed to be the builder of the hall at the Mote.
"	Robert	c. 1374	Richard II. ...	High Sheriff of Kent in 1371 (?)
De Haut	Henry	c. 1377	Edward IV. ...	High Sheriff of Kent in 1478 and 1482. Beheaded in 1484 at Pontefract, and estate confiscated.
"	Richard	c. 1450	Richard III. ...	Governor of the Tower of London, and killed at battle of Bosworth.
Brackenbury	Sir Robert	1483 4	Henry VII. ...	Estate restored by Henry VII.
Haut	Edward	1485	Henry VIII. ...	Bought the estate and built the chapel.
Clement	Sir Richard	1521	"	"
"	Sir John	c. 1532	"	Married a Clement heiress, and sold the estate.
Pakenham	Hugh	c. 1544	"	Bought the estate: he was a wealthy London merchant.
Allen	Sir John	1544	Elizabeth ...	Sold the estate.
"	Sir Christopher ...	c. 1550	"	Mayor of Berwick, and knighted by King James at Berwick in 1603.
"	Charles	c. 1580	James I.	Husband of Dame Dorothy, who revealed the Gunpowder Plot to Lord Montagu. She and her husband and uncle are buried at Ightham.
Selby	Sir William	1591	"	"
"	Sir William (nephew to the last) and others	1611	Victoria	Bought the estate.
Luard Selby	Lewes Marianne ...	1868	"	"
Colyer Fergusson ...	Thomas C. ...	1889	"	"

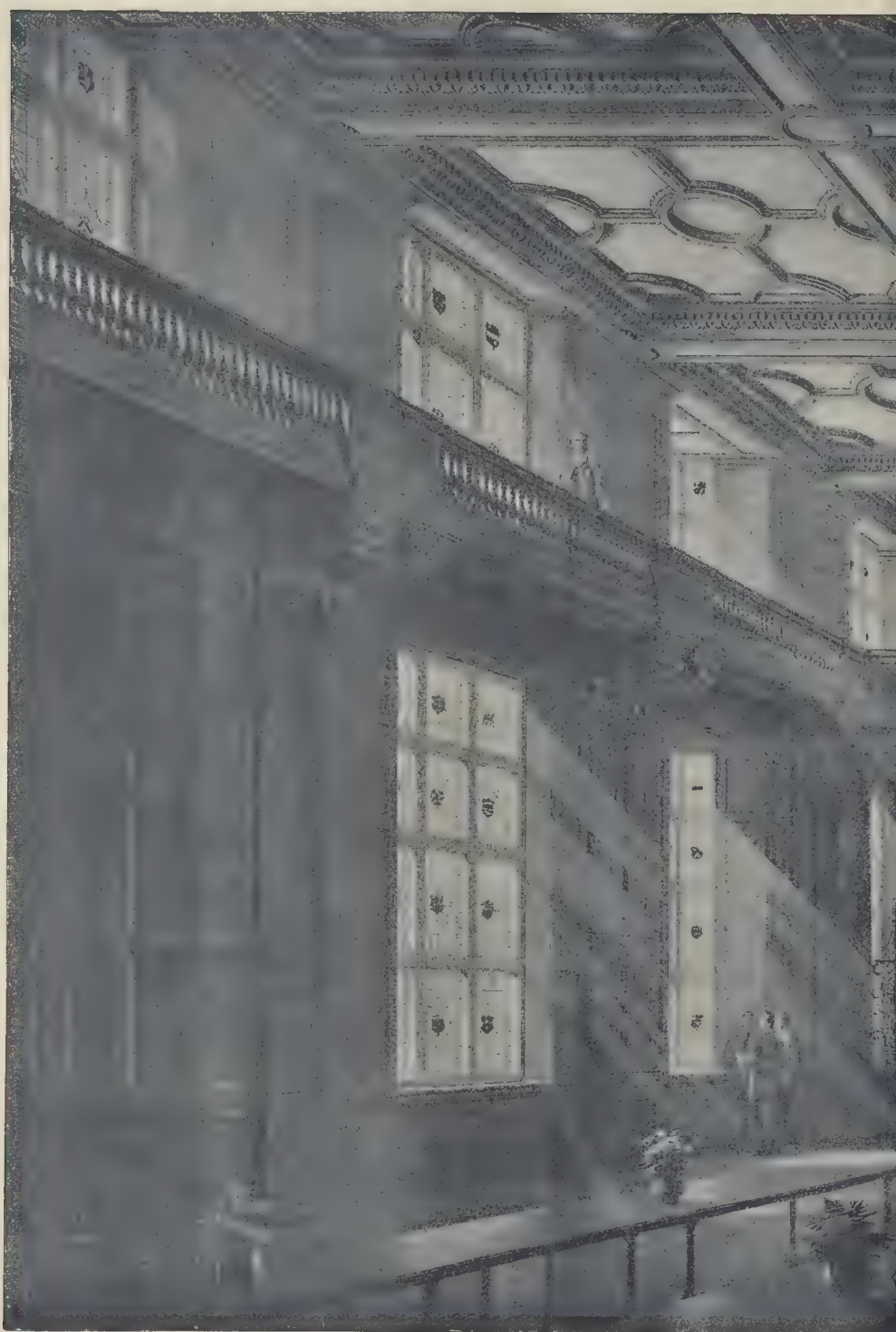
SUMMARY.

Haut or De Haut	302 years
Cawne or Couen	37 "
Brackenbury	2 "
Clement	23 "
Allen	47 "
Selby and Luard Selby	298 "
Colyer Fergusson	3 "

712 years.

The archway leading into the quadrangle from the west is faced with a perpendicular obtusely-pointed arch, carried on moulded corbels and labelled; it, and the windows above it on both sides of the tower, correspond to the work of the latter part of the fifteenth century. In the glass of one window, that on the first floor of the tower looking towards the quadrangle, the arms of Sir Richard Clement are exhibited, but we cannot accept this as sufficient evidence of his having had much to do with the erection of the tower, more especially as its general character is entirely different from that of the chapel on the north side of the house, which was almost certainly his work about fifty years subsequently. It is a singular fact that this window slightly differs in the trace of the lightheads and in its mouldings from the window above it, and from the windows on the west face of the tower, all of which correspond precisely with, and are apparently by the same hand as, the mullioned window of the hall on the east side of the quadrangle. It is also of a different width and proportion, and does not immediately underlie the window above it. The explanation is probably to be found in the corbelled-out chimney of the room on the second floor of the tower, which has apparently been an afterthought. It is therefore very possible that this chimney and window were subsequently inserted by Sir Richard Clement, who, at the same time, put his coat-of-arms in the window, but that the tower itself was built about 1486 by Edward Haut, who was well favoured by Henry VII. for his father's sacrifices in the Lancastrian cause. It is believed that this king and his queen, to whom Edward Haut's wife (a Woodville or Wydeville) was related, were entertained by him at the Mote. A turret has been added to the top of the tower by the present owner. The remainder of the west side exhibits no work corresponding in character or beauty with that of the tower with the exception of the west window of the drawing-room on the first floor. The windows on that side are (with the above-named exception) all small square-headed two-light windows, with either very obtusely pointed or semi-arched heads to the lights, and they have no labels. The lower story (except the north wall of this front) would appear to have been built or rebuilt at the same time as the tower, whilst the upper floor was not improbably added or reconstructed by Sir William Selby about 1592, which may account for the presence of his coat-of-arms on the face of the Tower. It is probable, however, that the drawing-room at the





INTERIOR OF GROCERS' HALL





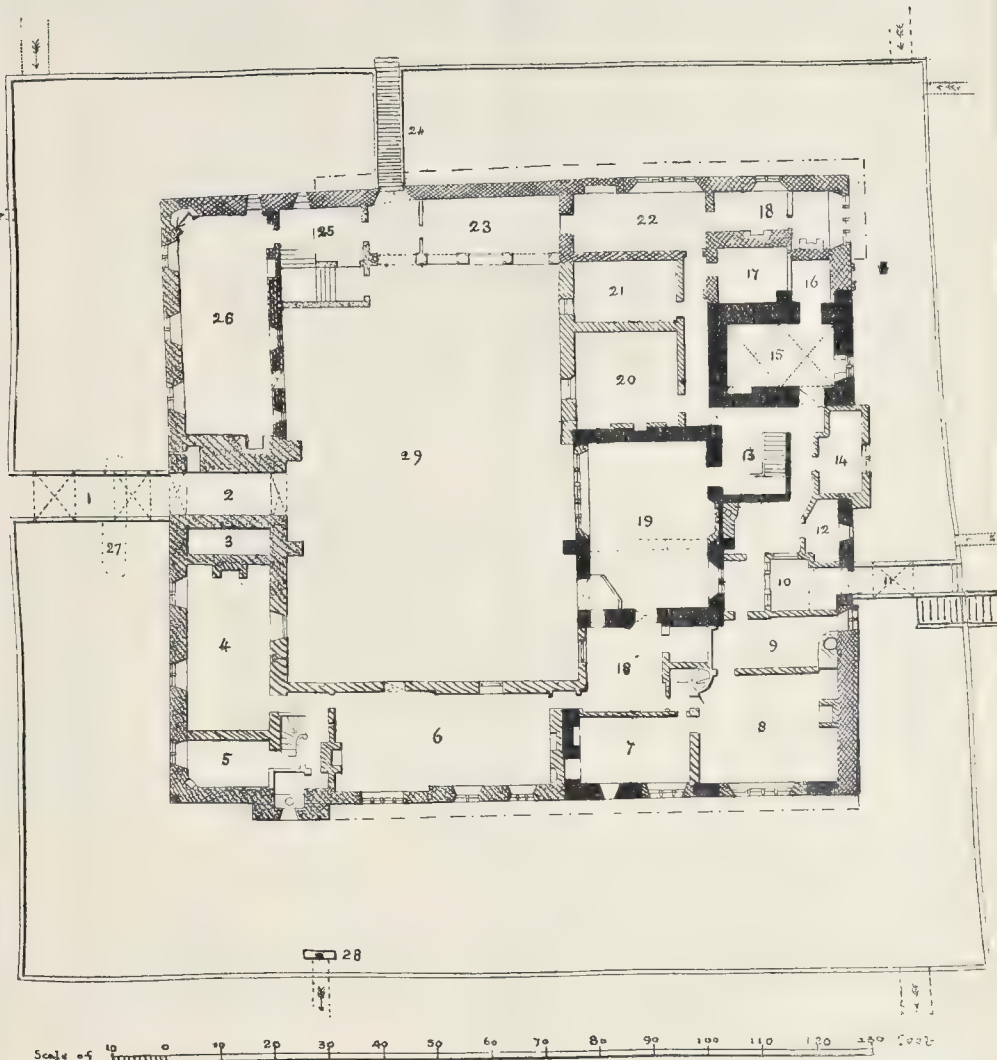


THE COURTYARD IGHTHAM



ENT—DRAWN BY GENERAL LUARD

North Side.



REFERENCES.

- | | | | | | |
|-------------------|--------------------|------------------------|--------------------------------------|-------------------------|---|
| 1. West Bridge. | 6. Library. | 11. East Bridge. | 16. Wine Cellar. | 20. Housekeeper's Room. | 25. Staircase to Chapel. |
| 2. Archway. | 7. Servants' Hall. | 12. Dairy. | 17. Court. | 21. Store Room. | 26. Billiard Room. |
| 3. Dungeon. | 8. Kitchen. | 13. Staircase. | 18. Butler's and Footman's Bedrooms. | 22. Pantry. | 27. Old Foundation for outer end of Drawbridge. |
| 4. Morning Room. | 9. Scullery. | 14. Larder. | 19. The Hall. | 23. Conservatory. | 28. Fenstock. |
| 5. Dressing Room. | 10. Court. | 15. Crypt (or Cellar). | | 24. Wooden Bridge. | |

north end of the upper floor had been added previously, judging from the remains of a label over the north window.

The north end of the wall on this side facing the quadrangle exhibits, on the ground floor, two very narrow (almost lancet) windows, with plain hollow mouldings and pointed heads, and a pointed doorway with chamfered jambs and arch, and it is very possible that this part belongs, and is almost the only remaining portion, of the original twelfth-century house. The windows at the south end of the same wall on both stories appear to be comparatively modern, and of the same character as the remaining windows and doorway on the south and part of the east side of the quadrangle; they are believed to have been put in during the present century.

The noticeable rooms on this side are, on the ground floor, the morning-room, long and low with deeply recessed windows and a finely designed oak chimney-piece, erected in 1856 by the late Major Luard Selby. Adjoining this is the space supposed to have been a dungeon, 15 ft. by 5 ft., to which access was obtained from the

- c. 1350 (Hall, &c.)
- Doubtful—possibly c. 1200 (West Wall of Quadrangle).
- c. 1450 (N.W. angle, &c.).
- c. 1486 (Tower, &c.).
- 1521-30 (Chapel).
- Doubtful.
- Quite recent (Billiard Room, Fireplaces, &c.).

Plan of Ightham Mote.

first floor of the tower. On the north side of the archway is the billiard-room, made so by the present owner, who has panelled the walls in oak, inserted grotesque oak corbels under the beams, formed two fireplaces (one with an inglenook) and altogether made it, with its deeply recessed splayed windows, into a very beautiful room, though unavoidably low. This work, and a good deal besides, was executed last year by Mr. Spokes of Oxford. Over this is the old drawing-room, 40 ft. by 17 ft., with the remarkable Jacobean oak chimney piece, now illustrated (see lithograph plate), the work of the second Sir William Selby, about 1620-30. Especially noticeable is the carved oak border surrounding the conchological marble front of the fireplace, the latter being apparently a subsequent addition, and possibly of the same date as the singularly ugly Classic window which has replaced the fifteenth-century window at the north end of the room. The walls of this room are hung with an extremely old Chinese paper, supposed to be about two hundred years old, which has been recently restored with

good care, and an additional fire-place at the N.W. angle has also been recently added. The paper is surmounted by a carved oak frieze with Saracen's heads (the Selby crest) at intervals. The passage leading to this room and the small tower-room are oak panelled, with linen-roll panelling from floor to ceiling.

A door leads from this drawing-room to the chapel staircase (recently rebuilt and panelled), which is surmounted by an eighteenth-century bell turret and clock, and also to the chapel, the reconstruction of which has just been very successfully completed without in any appreciable way altering its character, and with as little disturbance as possible to the details of the old work. This is a remarkable little chamber, 35 ft. by 16 ft. (see illustration) with a painted wagon ceiling, the ribs and interspaces being covered with cognizances and emblems of various families, both regal and private. The structure is very slight, timber-framed, and lined, and was probably the work of Sir Richard Clement, whose arms, with those of his first wife, who died in 1828, occur in several places. It is remarkable how closely the design of the carved panels of the pulpit correspond with some at Layer Marney in Essex temp. 1530. Underneath it is a doorway communicating with a wooden bridge which leads on to the bowling-green. The side next the quadrangle is carried on oak piers and an oak arcade enclosing a small conservatory, the piers and arches, &c., having been recently introduced by a skilful piece of underpinning, in substitution for the brick piers which formerly supported the chapel.

The north-east corner of the house is one of the most complicated of the many archaeological puzzles which this house presents. Stone mullioned windows, with quarter-round and fillet moulding both inside and out to mullions, jambs, and heads, characterise this part, a part between the chapel and the drawing-room, and also another part which lies immediately to the south of the east bridge. With the exception of the windows over the scullery, they have no labels, and even over those the labels have no returns, but in some cases the labels may have been removed when the overhanging timber structure of the upper story was built. This part of the upper floor is probably of the same date as the chapel, i.e., about 1530, from which it is separated by a priest's room and a confessional. There are examples of square-headed, mullioned, and transomed windows in domestic residences of both the fifteenth and fourteenth centuries, and there seems to be strong grounds for assuming that these parts of the house were erected about 1450, possibly by Richard Haut, who was a very considerable person.

Passing the vestiges of what appears to have been a cloaca overhanging the moat nearest the north-east angle, we come on the crypt or cellar, with vaulted ceiling of the usual type of the fourteenth and thirteenth centuries. It is a small chamber, only 19 ft. by 12 ft. and 8 ft. in height to the intersection of the ribs, which have plain chamfered arises and are carried on plain brackets. It is lit by a two-light Decorated window corresponding to the work of 1340-50. It carries a room of the same period of architecture, which was the chapel of that date; but the window is not of the same character as that of the crypt, and has probably been introduced subsequently: its head has perished and been replaced by a wood lintel. A Decorated piscina occurs in the west wall, and in the same wall is a doorway corresponding in style and moulding to the east doorway of the hall below; it communicated with some other rooms which have since been altered.

Contiguous to this chapel are two rooms whose gable ends face the quadrangle and exhibit singularly beautiful examples of sixteenth-century open-work barge-boards, in which the rose, thistle and shamrock are intertwined: one of these rooms has a mullioned and transomed oriel window.

Adjoining these rooms, and altogether detached from the line of the moat wall, lies the hall, built about 1540-50, probably by Sir Thomas Cawne, or Couen, whose finely-carved effigy in Caen stone lies under a Decorated canopy in Ighiteham Church. This hall is 30 ft. by 20 ft., and 35 ft. in height; the roof is high pitched, and carried partly by a pointed stone arch not quite centrally placed, very similar to the stone arches at Mayfield in the same county, and to a certain extent, by curved timber principals at each end. These arches are similarly moulded, and are supported, each in their own material, by corbels representing

quaint human figures in grotesque postures. The fireplace is of the fifteenth century, as also is the five-light west window, and they were probably constructed by Edward Haut about 1486, though the arms of Sir Richard Clement have been subsequently inserted into the glass.

A very beautiful two-light transomed Decorated window (blocked up for many years and only reopened in 1872) occurs on the east side. On the outside of this window, which looks on the back entrance and east bridge, the pointed heads of these lights have quarter round and fillet moulding filled in with hollow-moulded cinquefoil tracery, the three upper foils being broken with ogee countercurves. Enclosed by and overlying them is an octofol leaf of similar description, the whole being headed by a characteristic dripstone. The inner side is not moulded, having been simply rebated for shutters in accordance with the prevailing custom of the period, and a Decorated arch lines the head of the splayed recess. The hall was formerly entered by a Decorated doorway direct from the quadrangle, but when it was panelled by Mr. Norman Shaw in 1872 and reconverted into a dining-room, a doorway was broken through the east wall into the vestibule, and the old entrance partitioned off from the hall for the sake of comfort. The present kitchen contains a window corresponding almost precisely with that on the first floor of the tower, and was possibly inserted at the same time, i.e., about 1520-30.

The lower floor of the south front is of the same style as that of the west front, except the kitchen aforesaid and the small window in the servants' hall, which corresponds to that in the crypt, but the upper floor overhangs and is of subsequent date, partly Elizabethan. The library, another long, low room similar to the morning room, occurs on this side, the special feature of which is a very beautiful carved oak chimney-piece, also put up by the late Major Luard Selby. The remainder of the house, though interesting, calls for no special remark, except to note the outer quadrangle opposite the west front, of which only the west side, consisting of picturesque sixteenth-century cottages, now remains.

As the late J. H. Parker remarked, "To say this is a charming place says nothing, for this can be said of many a spot, but the Mote is a unique gem, unequalled in the county and perhaps in England."

C. E. L.

HOUSE, QUEEN'S-GATE.

This illustration shows a new front in terracotta and red brick which is now being put to a house in Queen's-gate which was originally faced in cement of an ordinary design.

The problem in modernising the house was to design a front which would be adaptable in style to most of the interior fittings and without interfering more than was absolutely necessary with the constructional work of the interior, the original plan of the house, and the windows and doors, &c., being retained.

New mantel-pieces in place of old marble ones and dado panelling have been fixed in the reception rooms and hall. Mr. I. Douglas is the contractor, the mantel-pieces having been made by Messrs Walker & Sons. Mr. R. A. Briggs is the architect.

The drawing from which the illustration is taken is exhibited at the Royal Academy.

ARCHÆOLOGICAL SOCIETIES.

THE ROYAL ARCHÆOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.—The annual congress of this Institute is being held in London this week, with numerous excursions and visits to places of interest round and about. In a "Note" on another page we say something of the opening proceedings on Tuesday last, and we will give some further account of the Congress next week.

THE BRITISH ARCHÆOLOGICAL ASSOCIATION'S fiftieth annual Congress is to be held this year at Winchester, from Monday, July 31, to Saturday, August 5. We have received the first edition of the programme, which includes some interesting papers to be read and a goodly list of places to be visited.

BRADFORD HISTORICAL AND ANTIQUARIAN SOCIETY.—The third excursion for the season of this Society took place on the 1st inst. to Grassington, to view the Roman camp and the contents of the tumuli that have been lately uncovered. At Grassington the antiquaries were met by Mr. Ernest E. Speight, who led them to the place where excavations have already commenced at Lea Green. A specially-prepared plan showed the numerous mounds and tumuli in

this spot. The encampment contained mill stones, dwellings, fireplaces, flint and stone implements, bronze rings, charcoal, ashes, and each tumuli had an inner and outer wall. To the north of Grassington is a much larger encampment which the discoverer, the Rev. Bailey J. Harker, calls Roman. The area covers 160 acres. The remains which have been unearthed are exhibited in the Mechanics' Institute at Grassington.

LANCASHIRE AND CHESHIRE ANTIQUARIAN SOCIETY.—On the 8th inst. about twenty members of this Society paid a visit to Lichfield. The members were conducted over the Cathedral by the vergers and one of the members of the Society, the Rev. E. F. Letts, M.A., who afterwards read, at the west front, a short description of the principal points of interest in the building.

DURHAM AND NORTHUMBRIAN ARCHÆOLOGICAL AND ARCHITECTURAL SOCIETY.—On the 23rd ult. a visit was made by this Society to Teesdale. The party, numbering sixty-six persons, assembled at Barnard Castle Station, where carriages were in waiting. They then drove by way of Strathforth to Egglestone Abbey. Here the Rev. J. F. Hodgson, after a few introductory remarks by the President (Rev. Dr. Greenwell), described the buildings, and gave an account of the history of the Abbey and the dates of the various buildings and alterations. It was founded, according to Dugdale, by Ralph de Mutton, about 1160. In 1370 the chancel was rebuilt, and the south transept shortly after, and later still the nave was rebuilt and widened 5 ft. The existing remains, which include the nave and part of the chancel and south transept, and also the domestic buildings, were examined, also the fourteenth century tomb to T. Rokeby in the nave. Great regret was expressed at the recent demolition of a part of the domestic buildings, which occurred two or three years ago. The party then proceeded to the banks of the Tees to the Dairy Bridge, near the junction of the Tees and the Greta, passing on the way the ancient churchyard of Rokeby. Here they visited Mortham Tower, a fortified house of Late Gothic work. Wycliffe was also visited, where the party were received by the vicar and General Blain. The church, built about the middle of the thirteenth century, was examined. Rev. J. F. Hodgson here gave a description of the building and its architecture. A great deal of the ancient stained glass, contemporary with the windows in which it is inserted, still exists, much of it set with medallions and shields.

PRIOR THOMAS SILKSTEDE'S SCREEN, WINCHESTER CATHEDRAL.

THE Christian name of the Prior may be read in the bosses of the cornice, the letters M.A. being given the place of honour; and his surname appears in the larger S and double rebus. Like all Silkstede's work, it is most accurately wrought, by, one might imagine, some very old man with the traditions of the Decorated period still in his mind; for the Prior died as late as 1524. The door is patchwork, the curious lock being ancient; and in the floor of the chapel is an inscribed slab covering the tomb of Isaac Walton.

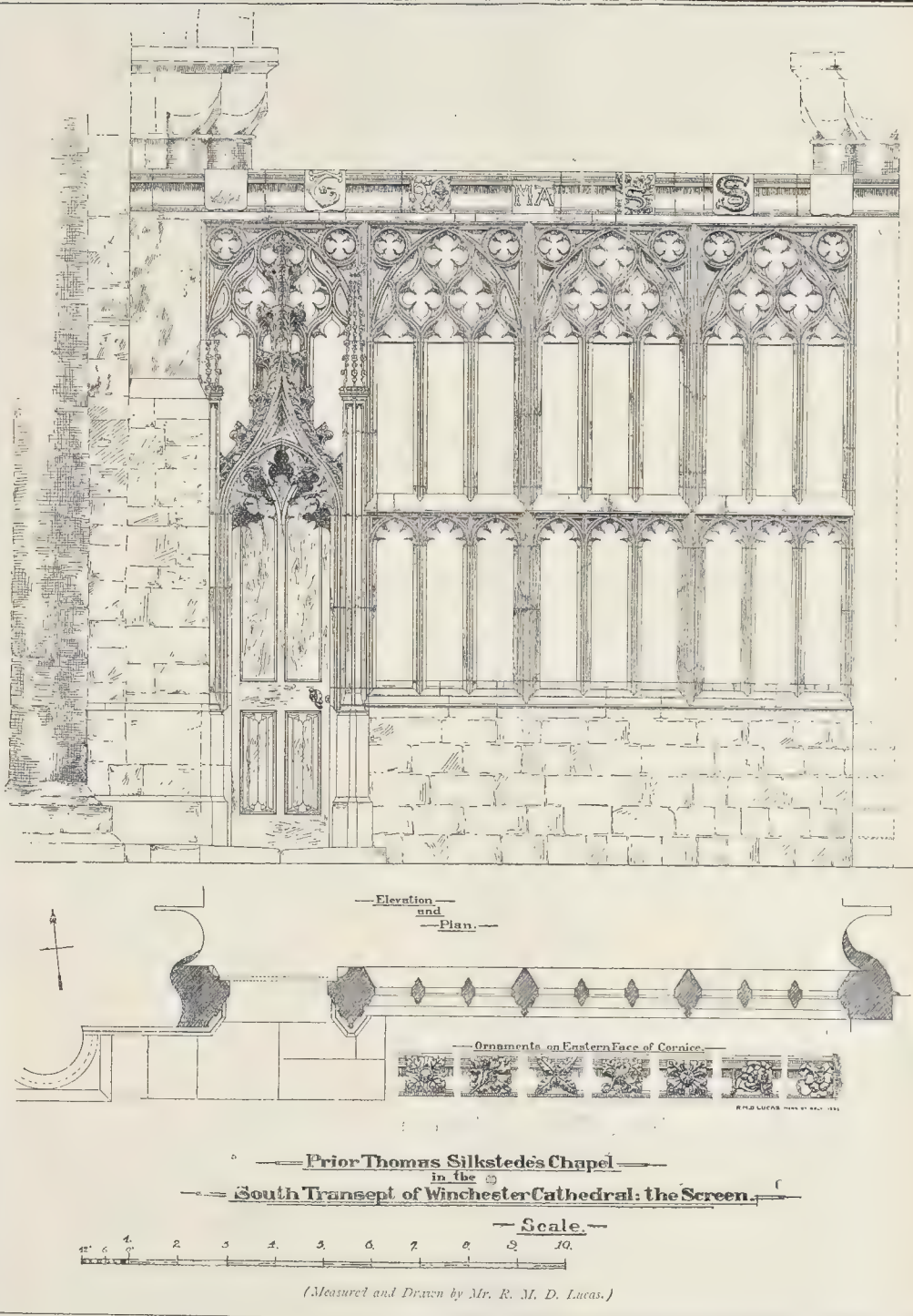
R. M. D. L.

CAPACITY OF WATER-CLOSET FLUSHING CISTERNS.

At the meeting of the London County Council held last week, the Public Health and Housing Committee reported on this subject as follows:—

"Regulation No. 21 made by the water companies under the Metropolitan Water Act, 1871, provides that every water-closet cistern or water-closet service-box, fitted or fixed after the confirmation of the regulations, in which water supplied by the companies is to be used, shall have an efficient waste-preventing apparatus so constructed as not to be capable of discharging more than two gallons of water at each flush.

The Local Government Board, to whom the power of confirmation of the water companies' regulations under this Act was transferred in 1875, has forwarded to the Council a copy of correspondence that has passed between it and certain of the sanitary authorities of London and the water companies respecting a proposal that regulation 21 should be altered so as to provide that every water-closet, cistern, or service-box shall be so constructed as to be capable of discharging three gallons of water at each flush. The Board asks for the Council's observations on the subject. Many of the sanitary authorities consider that a two-gallon flush is inadequate, while the water companies contend that two gallons are sufficient when proper apparatus is provided.



and that when the flush is unsatisfactory, the reason generally is because the down pipe from the cistern to the pan is of too small a diameter, and the inlet into the pan also too small. This, they assert, destroys the efficiency of the flush. The companies also state that to increase the size of the cisterns as suggested would involve an enormous increase in the quantity of water to be provided, and seriously affect the present undertakings and works of the

companies, in addition to causing great expense and inconvenience to occupiers of dwelling houses.

We have given careful consideration to the views expressed in the various letters forwarded by the Local Government Board, and have received reports from the Council's officers on the question. We have also made inquiries of six municipalities which control their own water supply, and learn that Edinburgh and Bradford have decided that three gallons

should be required, while Leeds allows two-and-a-half gallons in special cases. At Glasgow, Liverpool, Leeds, and Dublin, two gallons are used, but the City Engineer of Dublin is of opinion that this quantity is too low.

With regard to the statement of the water companies respecting the effect of imperfect apparatus upon the flush, we do not deny that there is an intimate relation between the conditions indicated

by the companies and the amount of water required for flushing, but we are nevertheless of opinion that two gallons is not enough for many kinds of apparatus now in use in London which cannot be considered as unsatisfactory. We are therefore of opinion that water-closet cisterns should be capable of discharging a three-gallon flush, and that regulation 21 under the Metropolitan Water Act, 1871, should be amended accordingly. We do not consider that the regulation if altered should be made retrospective, but we think that on and after the 1st of January, 1901, this regulation shall apply to all such cisterns, whether constructed before or after the confirmation of the regulation.

In addition to the above suggested amendment of regulation 21 there are a few other amendments of the regulations which we think should be made, and which we now submit—

i. The requirements as to the supply of water to water-closets should apply equally to the supply of water to sinks used for receiving any solid or liquid filth.

ii. By-law 3 made by the Council, under section 39 of the Public Health (London) Act, 1891, provides that every person who shall construct a water-closet in connection with a building shall furnish such water-closet with a cistern of adequate capacity for the purpose of flushing, which shall be separate and distinct from any cistern used for drinking purposes.

We think it necessary that a regulation shall be made which shall prevent cisterns being brought into use for supplying water for domestic purposes, or for food for beasts, so long as they directly supply any water-closet or sink used for receiving any solid or liquid filth, and that after January 1, 1901, this regulation should apply to all such cisterns, whether constructed before or after the confirmation of the regulation.

iii. We also think that in all cases where any premises have a constant water service there should be a requirement that one or more traps shall be provided for draining water used for domestic purposes from the rising main. We see no reason why this requirement should not at once be made retrospective. We recommend—

That the Local Government Board be informed that the Council considers—

(a) That, for the reasons mentioned in the foregoing report, water-closet cisterns should be capable of discharging a three-gallon flush, and that regulation 21 under the Metropolitan Water Act, 1871, should be amended accordingly; and that on and after the 1st of January, 1901, this regulation should apply to all such cisterns, whether constructed before or after the confirmation of this regulation.

(b) That the requirements as to the supply of water to water-closets should apply equally to the supply of water to sinks used for receiving any solid or liquid filth.

(c) That a regulation should be made which shall prevent cisterns being brought into use for supplying water for domestic purposes, or for food for beasts, so long as they directly supply any water-closet or sink used for receiving any solid or liquid filth, and that after the 1st of January, 1901, this regulation should apply to all such cisterns, whether constructed before or after the confirmation of the regulation.

(d) That in all cases where any premises have a constant water service, one or more traps should be provided from the rising main for the supply of water for drinking purposes; and that this requirement might at once be made retrospective.

These recommendations were agreed to.

Books.

Art Out of Doors: Hints on Good Taste in Gardening. By Mrs. SCHUYLER VAN RENSSELAER. London: T. Fisher Unwin. 1893.

THIS is a charming book both in literary style and make-up, with the additional merit that the author treats her subject both with good taste and enthusiasm, and we are glad to find in it a great deal which we have recently urged in these columns in connexion with the treatment of gardens in relation to architecture. Mrs. Rensselaer does not appear, as far as we can gather from the book, to have gone into very extensive reading on the subject; she refers to one or two authors in support of some of her views, but passes over the rather large bulk of old English literature on the subject, and appears also to be unacquainted with Mr. R. Blomfield's valuable little book on "The Formal Garden," to which no reference is made, and in which she would find a great deal said, from the architect's point of view, which is in entire support of her theories. Her own innate taste, however, has led her in the right direction, and possibly her book may be of special value in her own country, where we imagine (partly from the evidence of her own pages) that the consideration of this class of subject has not progressed as much as with us.

Without adopting any extreme views in regard to formal and informal gardening, Mrs. Rensselaer fully perceives and enforces the fact that a garden

is an artificial production, to be regarded from quite a different standpoint from the beauty of natural scenery. "It is easy to see," she observes, "that formal gardens must be demanded—or at least supported and explained—by some measure of formality in neighbouring things. An architectural terrace may be planted with them, though a naturalistic lawn may not; while they cannot look well in the centre of a freely-treated park-landscape, they may in some spot, defined by meeting paths, near the line where the flowing features of the park-design meet the symmetrical spaces in a city, where trees and shrubs could hardly flourish, we might use them much more often than we do. In fact, they are artistic when they look as though they belonged in the place where they lie." "Belonged in" is what we fear we should call an Americanism, but the sentiment is incontrovertible. Elsewhere, we find the remark that "we should gain in our large cities if the architect who does public work took an interest in gardening and were allowed to express it." There has been little enough of this in England in modern times, and we gather that there is still less in America; but here we see the dawn of an improvement in this respect, and it is to be hoped the same may soon be the case in the States. In the short chapter "A Word for Architecture" the author fully perceives the falsity of what is called rustic architecture, and has a word of criticism for Richardson's gardener's lodge at North Eastern near Boston, "built of huge rough boulders," which is characteristic enough, but "has been imitated in ways that Richardson never anticipated." The chapter on "outdoor monuments" is also full of excellent sense and artistic perception as to the relation between the monument and the scene in which it is placed. "The chief trouble," she observes, "has been that we think too little of the question of site," and moreover, we "ought to consider the monument as having opportunities for the architect as well as for the sculptor." Mrs. Rensselaer mentions one terrible example of the wrong way to do it in the case of a figure of a crouching panther in Central Park, "set, without any pedestal, on the top of a vine-covered rock overhanging the driveway." She adds that this was done against the sculptor's protest; and it is to be hoped that her strong condemnation of such a puerile treatment of sculpture may avail to prevent any similar absurdity being repeated.

We should have devoted more space to this book if it were not that we have recently had occasion to say a good deal on the subject on much the same lines, and it would be mere repetition to go through it again. We can only congratulate Mrs. Rensselaer on having produced so excellent and readable a book on the subject, from which, as far as we have observed, we have hardly a word of dissent to offer, and cordially recommend the study of it to her countrymen and countrywomen, to whom some of the views and criticisms expressed in it may be more new than they are to English readers.

A Record of Work: being illustrations of printing, stencilling and painting, stained glass, cabinet-work and marquetry, embroidery, a cover for a book and other decorative works, designed and executed by Alden Heaton. With notes by the designer. London: Simpkin, Marshall & Co. In his prefatory note to this charming collection of designs the author observes that he could have produced a much more attractive book of articles he would like to make, but considers it more to the purpose to give illustrations of what he actually has produced, to order. This is true in a sense, but it is rather a pity that, by adding to most of the designs a note of the price for which they were and can be produced, he has given to the book a little too much the aspect of a trade catalogue, and taken it, so far, out of the category of purely artistic publications. This is the only criticism we have to make, for the book is full of charming design, and in point of taste there is little to be found in it to which the most captious critic could take exception.

Mr. Heaton gives a list in the preface of certain enemies of his, the death of which he is glad to chronicle. Among these are "the huge drawing-room mirror, rounded at the top, like a mould of jelly"; "the 'handsome' white marble chimney-piece"; "the plaster ceiling-rossette, usually out of scale with the ceiling which it spoils," and one or two others. We heartily rejoice with him over the death of these enemies, if indeed they be really dead, but they die rather hard. The comments on various classes of furniture and what is to be desired and avoided

in regard to them, though brief, will be found sensible and suggestive.

The plates commence with a series of very graceful designs of overmantels, built on strictly architectural lines, and in which the figure is largely used as a part of the decoration. The chimney-pieces are rather less original, they are not much more than the elegant working up of well-known classes of detail. Plaster and stencilled friezes follow, of which the stencilled varieties, No. 18 especially, are admirable. To various designs for ornamental ceilings we have only to object that several of them include what we hold to be a falsity in taste, viz.: the use of hanging wreaths designed horizontally. An ornamental detail simulating the effect of curvature produced by gravitation can only be properly applied on a vertical wall surface; as soon as it is introduced on a horizontal surface, it becomes an arbitrary imitation of an effect produced by physical law, in a situation in which that law could not act. Of the stencilled wall-papers, No. 28 is too naturalistic, and looks as if it ought to be hand-painted; and the parts are too unconnected. No. 29 is vastly superior, being a kind of design which can be perfectly well done in stencil, and which it would not be worth while to paint by hand. Among the ceiling papers the "Ducal Palace," taken from the celebrated Venice building, and the "Felday," designed by Mr. E. P. Warren, are admirable, the latter the best; but it should be borne in mind that they are only suitable for rather large and sumptuous rooms. For rooms of ordinary dwelling-house scale a ceiling pattern should always be small in detail and design, and rather delicate in character; otherwise it overweights the room. The "Albinger" ceiling paper is admirable in style in this sense, but still rather large in scale. The wall-paper, "old English flowers," is more the style of work for a small ceiling, as far as character and scale are concerned; we do not say it would do for a ceiling paper, as it suggests upward or continuous growth, whereas a ceiling paper should always have a centralised appearance in the lines of its design; but as a matter of scale it would do very well for a ceiling, and is rather light and thin for a wall. The "St. Mark's" wall-paper, from a sculptured decoration in St. Mark's, Venice, is a fine and very suitable design, a happy instance of adaptation. The designs for stained-glass windows show admirable figure-drawing, in entire accordance with the conditions of the material.

Passing over a couple of very delicate and pretty floral designs for marquetry, we come upon some furniture, a little too much in the taste of Chippendale for our liking. We have always considered that the great merit of Chippendale's furniture lay in its admirably thorough execution and workmanship rather than in the style of design, which is too full of weak and rather wanton curves; it is the furniture of a somewhat frivolous society.

The book, while fulfilling very well its practical purpose of exhibiting the high ability of its author as a designer and draughtsman, is in itself a charming collection of well-executed illustrations of decorative work, in which everything is completely and carefully drawn, and no detail slurred over or carelessly treated.

Les Frères Van Ostade. Par MARGUERITE VAN DE WIELE. Paris: L. Allison et Cie.

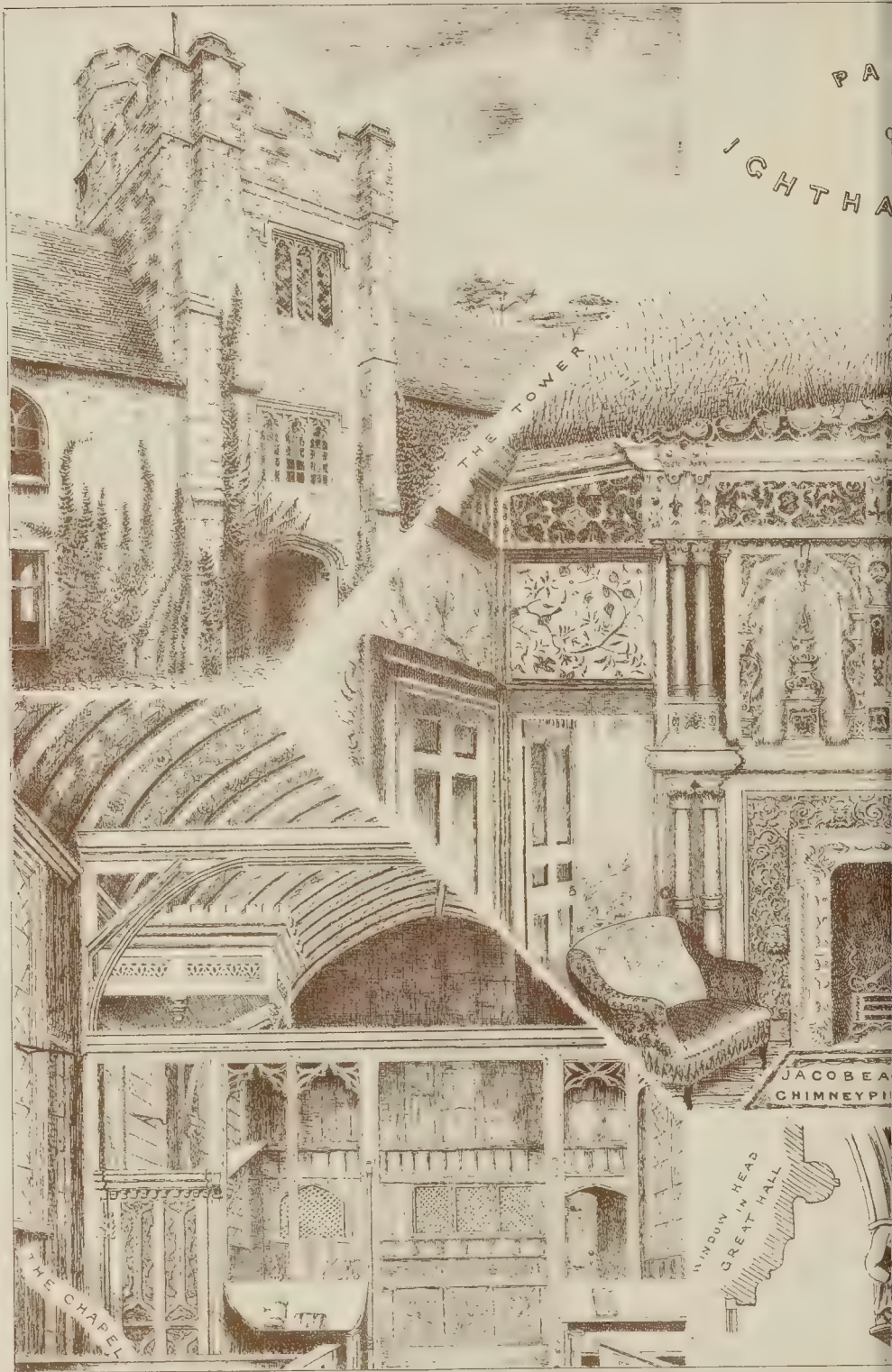
THIS is the latest of the series of "Les Artistes Célèbres," a good many of which have been noticed in these columns. The authoress has given a readable account of the two Ostades, written in a true critical spirit, not exalting the Ostades to a higher place than they justly claim in art; recognising their real powers and not ignoring their limitations. The book is largely illustrated, though the effect of the illustrations is not the best for the works of these painters, who depend so largely for their effect on splendid colour and tone. Ostade reduced to black and white loses much of the quality which makes his greatness, while the repulsive ugliness and vulgarity of his human types seems exaggerated even beyond the reality. This was inevitable under the circumstances; but the book is in other respects a satisfactory addition to a very valuable series of artistic biographies.

Theory and Analysis of Ornament, applied to the work of Elementary and Technical Schools. By FRANK LOUIS SCHAUERMANN. London: Sampson, Low & Co.

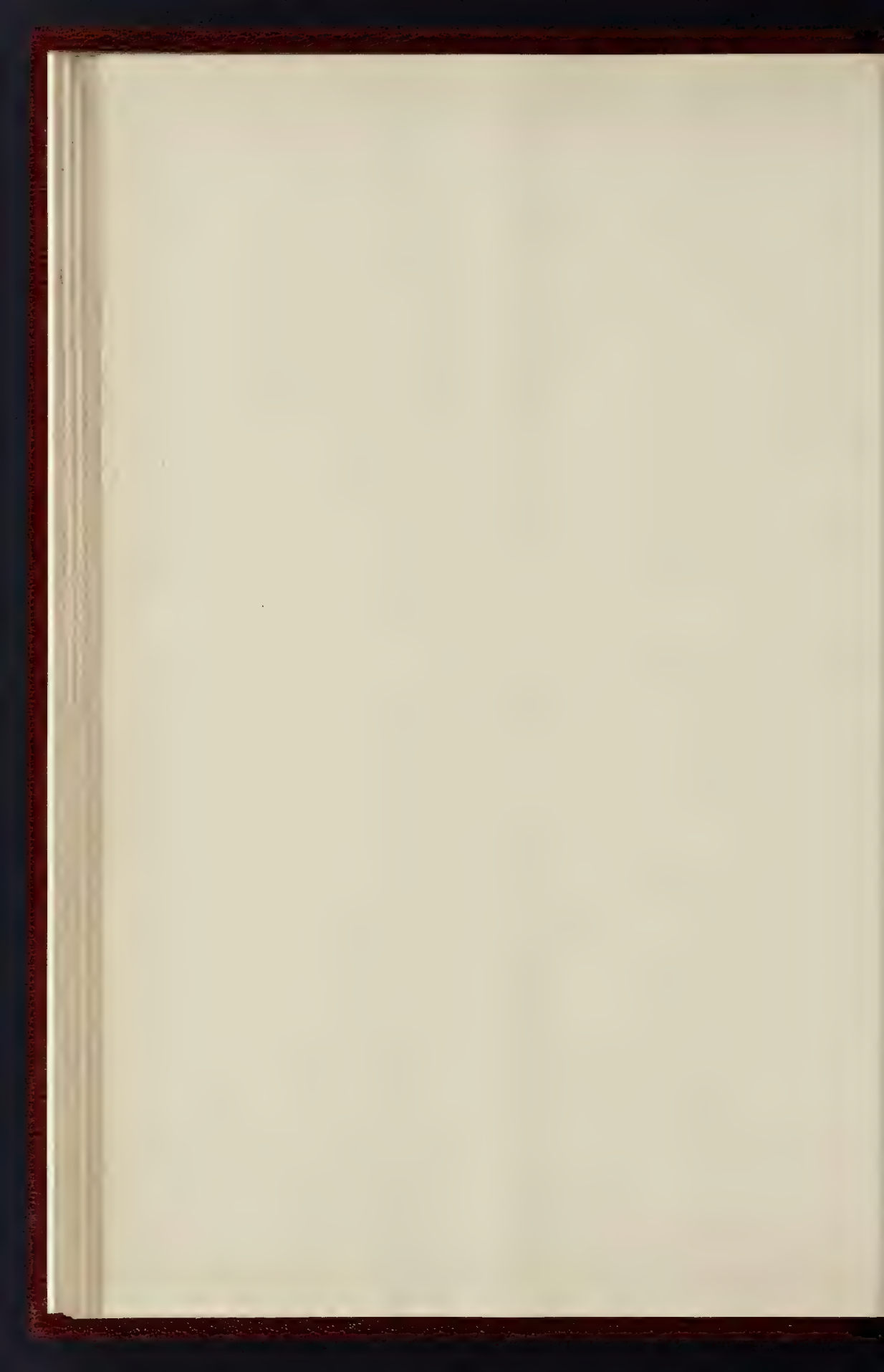
THE author of this book has a German name, and perhaps we may consider that it is the German tendency to theorise rather than illustrate which is exemplified in the book, including also some



IGHTHA







rather German-English; "curvity," for instance (apparently meaning curvilinear quality), and other literary barbarisms. The book is thoughtfully written, and as an analysis is not uninteresting to read; but any suggestion which the student may get from it in regard to the theory of ornamental development appears to us more than counterbalanced by the bad and utterly inartistic character of the illustrations, which in this sense are German all over, and such as are hardly to be tolerated in this country nowadays. Even in the small diagrams drawn with a pen to illustrate points in the argument, we might expect to find from a teacher of ornament some degree of artistic style and touch, which is entirely absent here. The larger plate illustrations at the end of the book are not very good representations even when they illustrate fine and standard examples of ornament (which only a few of them do), and the original design, as we suppose it is, for an oakleaf bracket (No. 2), is positively one of the very worst things in the way of a design for carved ornament that we have ever seen; bad naturalism, without a trace of artistic breadth or convention, a kind of thing that it really makes one angry to see. We regret to have to say this, because the author certainly means well and has given a good deal of thought to what may be called the philosophical side of his subject, and some of his thoughts may prove suggestive to designers as to the direction in which they should work; but the book forms an unfortunate illustration of the fact that all the thinking in the world will not of itself produce a draughtsman or a designer.

Municipal Improvements: A Manual of the Method, Utility, and Cost of Public Improvements for the Municipal Officer. By W. F. GOODHUE, Civil Engineer. New York: John Wiley & Son, 1893.

THE words in the title, "for the Municipal Officer," explain the scope and intent of this small book. It is not a book for professional men, but a series of short chapters on the various classes of problems to be dealt with in public improvements, intended to assist gentlemen who are elected to sit on municipal councils with a knowledge of what are the objects to be arrived at in carrying out municipal improvements. Technical phraseology is purposely avoided, the object being to make the requirements of the case clear to those who would not understand technical terms. The author thoroughly understands the subjects of which he thus gives the outlines; and though the book is written by an American engineer for American town councillors, there is little in it, except some minor details as to materials, which is not equally true and equally applicable on this side of the Atlantic. English county councillors might find it worth their while to buy and study this small book.

We may note that on the subject of wood pavements the author expresses the same opinion which we have more than once expressed, but still more strongly:—

"Wood pavements in their best condition are simply makeshifts. They are not durable, do not wear smoothly, are not cleanly, and in a few years they become so rotten that they are a menace to the health of the inhabitants residing in the street in which such pavement is laid. A wood pavement that is well sprinkled in the summer months is as prolific of mosquitos as are the cedar woods in the wilts of northern Wisconsin."

Mosquitos do not abound in England, but wood pavements here have all the other objections which Mr. Goodhue urges against them in the States. One other remark about the importance of the state of city streets is worth quotation: "The stranger visiting a city for the first time does not always remember the handsome buildings it may have; but if its streets are execrable he never forgets them."

PULPIT, ENFORD PARISH CHURCH, WILTSHIRE.—The parish church of St. Margaret, Enford, has received an addition in the shape of a new carved oak pulpit, erected as a memorial to the late vicar. It is of Jacobean character, and has been designed by Mr. C. E. Ponting, F.S.A., architect, of Lockridge, Marlborough. The work has been carried out by Messrs. Harry Hems & Sons, of Exeter.

THE SANITARY INSPECTOR'S EXAMINATIONS FOR INSPECTORS OF NUISANCES.—An examination for Inspectors of Nuisances, held at the Town Hall, Leeds, on Friday and Saturday, July 7 and 8, fifty candidates presented themselves. Of these, twenty-one candidates were certified, as regards their sanitary knowledge, competent to discharge the duties of Inspectors of Nuisances.

Correspondence.

To the Editor of THE BUILDER.

THE FIVE-PER-CENT. SYSTEM.

SIR,—In a "Note" in your last issue [p. 26, ante], you comment upon a case, in the *Times* report of which Lord Coleridge is made to say that he would not be a party to the custom—supported by the R.I.B.A.—of allowing charges, calculated at a percentage on the cost of works never executed, or "not done," as his Lordship put it. While I quite see the point of your "Note," I think there is something to be said for Lord Coleridge's views on the question, as I understand them. For my own part, I don't at all like the custom that architects have adopted of charging a percentage—by way of a fee—on the cost of works entrusted to them. This system is at best but a rough and ready method to adopt, which sometimes "pays," and quite as frequently does not. When, however, the works contemplated fail through, I think the percentage charge should most certainly be dropped, and a charge made for the "work done," viz., the various sketches, drawings, specifications, &c. Lord Coleridge could not say a word against such a charge, and architects would then be able to base their fees upon the skill, trouble, and time involved, instead of upon the problematical cost of a building which the architect generally values at one sum, while the builder estimates for it at another.

As long as we charge by commission we must lay ourselves open to the charge—which our enemies are not slow to make, of running up the cost of a building and introducing "extras," &c., for the sake of the commission. But even if individual architects like to charge in this way, I do not see why the Institute should encourage the custom; but given that this advisable. I do not see the necessity for reducing us all to the one dead level of 5 per cent. per head all round, Fellows and Associates alike. We cannot surely all be worth the same; and if not why charge alike? Personally I think the Institute should let us charge what we think fit and in our own way.

If "the Public" paid different prices for its architecture it might in time learn to distinguish the good from the bad. At present it is, I fear, encouraged to think that there is only "one quality" produced apart, of course, from sanitary arrangements. Why, for example, should the architectural R.A.'s be "all one price," when the painters, for instance, vary considerably in their marketable value?

Even engineers, whose work is in some respects not unlike our own, have no fixed scale of charges; or at any rate their Institution in no way recognises any such scale, and leaves its members free to charge in any way that they think proper.

Of three things I am convinced—
1st. That the principle of charging a commission on the cost of executed works is a bad one.
2nd. That the principle is worse when it comes to be applied to works not executed.

3rd. That the Institute should not encourage in any way either of the above.
I have no doubt I shall be told that at a Conference of Architects, held on such and such a date, this and that was resolved. Very likely. My only reply will be, that the sooner another conference of architects will undo what the former one has done the better I, for one, shall be pleased.

LEONARD STOKES.

THE CHURCHES OF THE LEICESTER-SHIRE WOLDS.

SIR,—In his description of the recent visit of the associated Architectural Societies to Melton Mowbray [see *Builder* for June 24, p. 487], your correspondent was in error in describing the tower of Waltham Church as of one date throughout: like so many others in the neighbourhood, the lower stage is of Early English date, while the upper portion is Perpendicular. Next to Melton and Waltham the most interesting church in the district is that of Burkmunster, whose massive Early English steeple occupies an unusual position at the east end of the south aisle of the nave. The body of the church is chiefly Decorated, but the Perpendicular work of the chancel, naves, and south porch is exceptionally fine. Internally this church is unique in the possession of a lofty octagonal turret, rich in panelling and tabernacle work, which stands very near the chancel arch and gives access to the belfry, formerly also doubtless to the rood-loft.

Other churches of interest, apparently passed by, are those of Eastwell and Eaton, the latter with a good oak screen, the former with a massive one of stone, consisting of a wall pierced with a central pointed doorway, and on each side a square-headed opening of three lights, with Late Decorated tracery. The church at Scalford is really fine, with a stately tower similar to those of Syston, Sibley, and Rothley, in a different part of the country. The district is rich in early fonts, some of great beauty, as Waltham. During the earlier periods, a pleasant colour effect was obtained by the use of the local ironstone, with Ancaster, Ketton, or Stanion stone as a dressing. Later, in the Perpendicular period, the more costly stone only was used.

A. H.

The Student's Column.

GEOLOGY—III.

THE IGNEOUS ROCKS.

HAVING said something of the aqueous rocks, and their subdivision according to their fossil contents, we may now refer to the igneous. We have shown that the first aqueous rocks must have been derived directly from the wasting away of the igneous, but the student will readily perceive that, as time went on, and the aqueous by earth movements were caused to appear above the level of the sea, they, too, by their own denudation provided materials for subsequently deposited aqueous rocks. This process has been repeated up to the present day. Thus the consolidated igneous rocks which formed part of the original earth's crust, as they, in the ordinary course of events, sank beneath the waters, became covered up by a great thickness of aqueous rocks. And if we glance at a geological map of the world which represents the occurrence of the different kinds of rock as they now appear on the surface of the earth, we shall see that the igneous do not occupy such large areas as the aqueous. Nevertheless, they are extremely important for our purposes and must in no wise be neglected.

The only opportunities we have of examining igneous rocks are on the sites of volcanoes which are active, or have recently, in a geological sense, become extinct; and in other districts far more numerous, where the igneous rocks, once seated deep in the earth's crust, have been brought to the light of day by the all powerful agents of denudation, which have worn away the strata that formerly covered them up. Now, in the British Isles we have, fortunately, no active volcanoes, though there is good evidence in the Western Isles of Scotland, and in the north-west of Ireland, that volcanic action was in full display there during Tertiary times; and our observations here are consequently restricted to the second class of igneous rocks referred to—those that have been bared by denudation. In investigating these the geologist, however, is compelled to study the nature and effects of volcanic action abroad, and the curriculum of his education is not complete unless he has visited Vesuvius, Etna, Stromboli, &c. Failing that, he must be contented with minutely investigating the products of such volcanoes, which are found in most museums of natural history, and trust to written descriptions for the remainder.

From the foregoing it will be observed that igneous rocks may be divided into two main groups, (1) *volcanic*, which have been ejected from the throats of volcanoes, or are found at only a small depth from the vent in extinct volcanoes dissected by denudation; and (2) *plutonic*, which cooled and consolidated at some depth from the surface, and have been subsequently bared for our inspection.

Volcanic rocks.—We will now say something concerning the former of these groups—the volcanic. A volcanic eruption is usually attended by earth tremors, subterranean rumbling noises, and the expulsion, by successive explosions, of volumes of gases and vapours in the form of steam, &c., a great quantity of loose ejectamenta and lava.

The term *lava* applies to all molten rocks that have either been thrown out of the volcanic vent, consolidated in the neck of the volcano, or have been injected into surrounding rocks, from the neck.

The other ejectamenta are more or less fragmentary in character. During an eruption the disengagement of steam, contained interstitially in the liquid rock, forms a tremendous explosive which detaches portions of the molten matter, blowing them out of the vent high into the air. The pieces so detached range in size from light particles of dust, to lumps several feet in diameter. Vast quantities of these loose materials are disengaged, and fall around the crater, and on the sides of the volcano, thus producing a high conical mountain. The large fragments are called *bombs*; the minor *lapilli*, and the smallest *volcanic sand* and *ashes*. In addition, pieces of the rock through which the molten matter bored its way to the surface are also ejected, sometimes in great quantity.

The student will, therefore, see that an ordinary volcano is built up of successive layers of lava and fragmentary materials. The latter, in course of time, frequently become cemented together, making a solid rock. On the volcano being sufficiently denuded, these layers are often found to be cut up by igneous dykes, which are veins that have been injected into them from the central

pipe of molten matter. There are many types of volcanoes, however, each producing widely different features in the landscape. The volcano just described is conical in form, but its upper portions may be very much modified in shape by the violence of successive eruptions, and parasitic cones may form on its sides, creating a very irregular outline. Others are dome-shaped, or merely undulatory. The last-mentioned are not in active operation at the present day. They have been caused by what are known as "fissure eruptions," that is, gaping fissures have formed in the ground, through which lava has welled up and spread as a sheet over the surface of the surrounding country. There is every reason to believe that the manifestations of volcanic energy at present going on are not altogether representative of what has taken place in past geological periods.

2. *Plutonic*.—These rocks, having consolidated at some depth from the surface, or at least under great pressure, tell us nearly all we know concerning the probable condition of the reservoirs of volcanoes, or as to the state of matter which has once been molten at certain depths within the earth's crust. Familiar examples of such rocks are granite and syenite.

THE CLASSIFICATION OF IGNEOUS ROCKS.

(a.) *According to Structure*.—If we compare the minute structure of a hard piece of lava, with a sample of granite, one great difference at once strikes us. Under the microscope we see that the granite is made up entirely of crystalline minerals squeezed together and interlocking, or adhering to each other; whilst the lava, although usually containing crystalline minerals, contains also some cementing material binding them together, which may form the bulk of the rock. In other words, one is thoroughly crystalline, and the other is not. We are anticipating a little, but this seems a fitting occasion to draw attention for a moment to the circumstances under which those different structures have been produced. We know that the pressure under which an igneous rock has consolidated is the prime factor in determining its structure. When lava cools at the surface of the earth it does so under the pressure of the atmosphere at the place, plus so much of its own weight as may be above the points of consolidation. But when a plutonic rock cools, it is under the pressure also of millions of tons per square inch of superincumbent earth. We cannot now enter into other conditions which assist in the work, but it will suffice to repeat that, owing to their modes of origin, the plutonic rocks are always thoroughly crystalline in character, having no matrix between the crystals; whilst the volcanic are never thoroughly crystalline, and are often of a fragmentary and earthy character.

(b.) *According to Chemical Composition*.—If a lava and a granite present such divergent types of structure they are, nevertheless, frequently of the same approximate chemical composition. On the other hand, both lavas and plutonic rocks vary much amongst themselves chemically. Immediately it became known that the prime cause of their structure was pressure, it was realised that molten matter of the same chemical composition might produce very diverse types of rock, according as it cooled at the surface, or at great depths underground. This, amongst other things, has led to a chemical method of classification. Under this, all igneous rocks fall into three groups, depending on the proportion of silica they possess. These are (1) *acid*, containing over 60 per cent. of silica; (2) *intermediate*, between 60 and 35 per cent.; and (3) *basic*, less than 35 per cent. and rich in bases. There is every gradation between these classes, and it, therefore, sometimes becomes difficult to place a rock in its proper division. Like all other classifications of Nature's productions, this one is merely useful for purposes of reference, and from its constitution is necessarily arbitrary, and from its hypothetical than real.

CHANCEL SCREEN PEWSEY PARISH CHURCH, WILTSHIRE.—A chancel screen designed by Mr. C. E. Ponting, F.S.A., architect, of Lockeridge, Marlborough, has been placed in the parish church of Pewsey. The work has been carried out by Messrs. Harry Hems & Sons, of Exeter. It is of English oak, and consists of five bays, the centre one forming the approach to the chancel.

TRADE FESTIVITY.—The employees of the firm of White & Sons, late Gibbons & White, metal workers, of Oxford-street, London, celebrated on July 8 the hundredth anniversary of its establishment, by a road excursion to Weybridge.

GENERAL BUILDING NEWS.

MUNICIPAL BUILDINGS, OXFORD.—The foundation-stone of the Oxford Municipal buildings was laid on the 6th inst. The architect of the new buildings is Mr. H. T. Hare, of London, the builder being Mr. J. T. Chappell. We published a perspective view and the two principal plans of the building in the *Builder* for July 9, 1892.

KIRKWOOD, OF DUNCUMBE HOUSE, DUNCUMBE PARK, YORKSHIRE.—According to the *Leeds Mercury*, the rebuilding of Duncumbe House, which was destroyed by fire on January 11, 1879, is proceeding apace. The foundation-stone of the new mansion was laid in February, 1891, and it will be at least another year before the house is ready for occupation. The principal structural work is, however, now completed. The style adopted is on the lines of the old house, with some modifications; but the strong Doric character of Vanbrugh's old design is preserved. The basement is most effectively planned, and the grand hall and saloon above are magnificent rooms. In the large saloon will be again placed the Feversham art collection, which was rescued from the fire. The hall is 40 ft. square and 30 ft. in height, and is to be furnished with stone dressings, fluted columns, with Corinthian capitals. The saloon is larger than the old one, but of the same design, with niches for the statuary. There are two large staircases—of oak and of stone—the floors above; and there are about thirty bedrooms in the house, besides those in the servants' wing, which was not destroyed in the fire. The new chapel will be larger than the old building. The floors are all of fire-proof combination, and the house throughout will be heated by hot-water pipes (Haden's system) and lighted by electricity. The mansion has been built of freestone from Earl Feversham's own quarries at Farndale and Bladale. The architect of the new house is Mr. Young, of London; and the contractor, Mr. Kirkwood, Edinburgh. The probable cost of the new mansion is between 30,000l. and 40,000l.

LOWESTOFT.—The "Grand Hotel" Lowestoft was opened on Monday last, occupying the site of a former private house which has been partly utilised in the construction, and the Hotel elevations carried out in the same style of red brick with terra-cotta dressings, with a frontage of 250 ft. The ground-floor contains a spacious hall, lounge and inglenooks, decorated in Moorish style. A central corridor, 24½ ft. long by 5½ ft. wide, reaches from north to south, the ends having glazed casement doors leading into the grounds. On either side of this corridor, at the south end are suites of rooms, named—Suffolk, Norfolk, Essex, East Anglian, and Croysey, comprising on the east or sea front, sitting rooms, and on the west front bedrooms, these all having casement doors leading on to the lawns. The principal dining hall is 60 ft. by 25 ft. with three deeply recessed bays on the sea front. There are also coffee room, smoking lounge, and billiard room, the latter 40 ft. by 28 ft., with open timbered ceiling, containing two billiard tables, and having recesses for lounges, completely fitted lavatories, &c. The drawing room is a sumptuously furnished room 40 ft. by 20 ft., with two large recessed bays with glazed casement doors on the sea front. A central staircase leads to the first floor, lighted with lead-glazed windows. The second floor of Norfolk, Suffolk, Lowestoft, East Anglia, and Essex. A central corridor also runs through this floor from north to south, having rooms on either side comprising suites of sitting, bed, and dressing rooms. The kitchens and offices in the centre of the building are on the ground floor, or level with the dining hall and reception rooms, but completely cut off from the hotel by passages, and form in fact a building by itself, so that no smell from the cooking can possibly permeate the hotel. The architect is Mr. Walter Graves, of London. The contractors, Messrs J. Youngs & Son, of Norwich, who have carried out the work under the immediate superintendence of Mr. E. R. Burch, the clerk of works. The sanitary work has been carried out by Mr. George Versey, of Lowestoft, conjointly with Messrs. John Bolding & Son, of London; the ironwork by Messrs. Barnard, Bishop, & Barnard, of Norwich; the ventilation system by Mr. Kite, of London; the gaswork by Mr. Bellingham, by Messrs. Waller & Smith, of Lowestoft, and Messrs. Benham & Sons, of London; and the kitchen and stillroom apparatus have been supplied and fixed by Messrs. Thomas Waller & Co., Fish Street-hill, London. The hotel is entirely furnished by Messrs. Maple & Co.

CATHOLIC CHAPEL, SUDBURY, SUFFOLK.—On the 27th ult. the foundation-stone of a new Catholic chapel, to be erected on the Croft, Sudbury, near the site of the former chapel, was laid. Mr. Leonard Stokes, of Westminster, is the architect, Messrs. Grimwood & Son being the contractors. The new chapel will consist of a nave of five bays, with chancel, and Lady chapel on the north side of the nave, and also a large sacristy under the chancel. There will be a small tower, surmounted by a fleche, containing a bell. In the west front will be a six-light window. Over the porch door will be a group of niches, intended for figures of the patron saint of the church and of the diocese. The style of the building will be Late Decorated.

NEW CHURCH, ELDWICK, YORKSHIRE.—The foundation-stone of a mission church was laid at Eldwick a short time since. The church—the plans

of which have been prepared by Messrs. Armistead & Parkinson, of Bingley and Bradford—will be built on a site near the main road at Eldwick, and the structure will be of stone. There will be chancel and nave, with a vestry on the south side of the chancel. Under the vestry is the heating chamber and a room. The heating will be by hot water, on the low-pressure system. The contractors for the various works are:—Masons' and joiners' work, Messrs. W. Ives & Co., Shipley; plaster, Mr. H. Spurr, Bingley; slater, Mr. W. Thornton, Bingley; plumber, Mr. J. Hodgson, Manningham; and painter, Mr. J. W. Anderson, Bingley.

NEW CHURCH, KETERING.—The foundation stone of the new permanent Church of St. Mary the Virgin was recently laid at Kettering. The nave and aisle of the church will be 39 ft. by 44 ft., and the chancel 40 ft. by 25 ft. In addition there is a vestry for the clergy and choir, and an organ chamber. The structure is being built both inside and out mainly of the local sandstone, relieved with dressing of local Weldon stone. The roof will be of red Broseley tiles. Mr. G. Henson, of Wellingborough, is the builder, and Messrs. Gotch & Saunders, of Kettering, the architects.

BOYS' CLUB AND GYMNASIUM, BRISTOL.—On the 22nd ult. the memorial stones were laid of the buildings in connexion with St. Agnes' Church, Bristol, which are to be set apart for the purposes of a boys' club and gymnasium. The plans are the designs of Mr. W. W. Bethell, of London, by Mr. George Downs. On the basement there will be a playroom, 28 ft. 6 in. by 27 ft.; a carpenter's shop, 23 ft. by 19 ft. 6 in., together with three baths, lavatory, &c. The senior boys' rooms on the ground floor consist of a gymnasium, 61 ft. 9 in. by 27 ft. 6 in., with a height of 20 ft. 6 in., on the same floor a games' room, 28 ft. 9 in. by 27 ft., and a reading room. On the first floor, which is to be set apart for junior boys, there is a games' room and drill room combined, 61 ft. 5 in. long with an average width of 29 ft., and a reading room. The building is of Bath stone, the walls and roof being covered with Broseley tiles. The windows are filled in with traceried Bath stone.

NEWMARKET STABLEMAN'S INSTITUTE.—This building was opened on Tuesday last by the Prince of Wales. It stands in Vicarage-road, and contains a committee-room (over the vestibule), a concert-hall measuring 70 ft. by 35 ft., and 26 ft. high, a library, kitchen, and offices. The style is, we read, the Italian Renaissance, executed in red brick, with copings and ornamental stone-work of red Mansfield stone. The work has been carried out, at a cost of 4,000l. by Mr. John Bentley, of Waltham Abbey, under the immediate charge of Mr. Holgate, from the plans and designs of Messrs. A. S. Manning, M.A., and Mr. William C. Manning, of Newmarket, architects.

ENLARGEMENT OF HORFIELD CHURCH, GLOUCESTERSHIRE.—The foundation-stone of the enlarged portion of Horfield Parish Church was laid the other day by Mrs. Pigou, the wife of the Dean of Bristol. The scheme includes a new chancel and two transepts, but at present only the chancel is to be proceeded with. The builders are Messrs. William Cowlin & Sons, and the architects Messrs. Crisp & Catley.

POST OFFICE, BRICLEY HILL, STAFFORDSHIRE.—The new building in High-street, Bricley Hill, is being rapidly proceeded with, and it is expected that the work will be completed towards the end of the year. The office will be completely fitted up, the public office being 27 ft. by 19 ft., the telegraph instrument room 17 ft. by 13 ft. 6 in., and the sorting office 60 ft. by 22 ft. The building, which will be of Ruabon brick, with stone dressings, will have a frontage of 35 ft. 6 in. to High-street, and there will be an open passage 7 ft. wide at the side. The work is being done by Mr. C. A. Horton, builder, under the supervision of Mr. E. J. Seehfield, of her Majesty's Office of Works.

WESLEYAN CHURCH, CONSETT, DURHAM.—The new Wesleyan church which has been built at Consett, in the main street, adjoining the Town Hall, was opened recently. The church will provide accommodation for 500 persons on the ground floor and 350 in the gallery. The external walls are of grouse stone, and the interior is dressed facing. The style of architecture adopted is Late Gothic. At the south-west angle is the tower, the stop stage of which is pierced with traceried windows. The contractors for the buildings are Messrs. E. & J. R. Taylor, Benfieldside; and the architects are Messrs. Lamb, Armstrong, & Knowles, of Newcastle.

PEWSEY GIRLS' TRAINING HOME, WALKLEY, NEAR SHEFFIELD.—The building at Walkley which was used for many years for Mr. Ruskin's museum has just been converted into a Girls' Training Home. Mr. H. W. Lockwood, of Sheffield, was the architect who carried out the alterations and additions to the premises. On the ground floor there are now entrance hall with committee and waiting rooms, dining hall, schoolroom, matron's room, kitchen, store and cloak rooms. On the first and second floors are dormitories for about fifty girls. The laundry block comprises receiving and despatching rooms, warehouses, laundry, and store room. The buildings are pre-fabricated on the Pease Hill quarries. The contractor was Mr. J. Midwood, and the laundry has been fitted up by Mr. Harper Twelveteers, of Manchester.

PARISH CHURCH, PEASEDOWN, SOMERSET-SHIRE.—On the 24th ult. the consecration took place of the churchyard and new parish church of St. John the Baptist, Peasedown. The architect of the new church are Messrs. Bodley & Garner, of London, and the contractor Mr. Franklyn, of Diddington, Oxford. The chief material used was Bath freestone. The church, which is arranged with a view to possible enlargement, seats 450 people, and consists of two transepts, a side chapel, and two vestries. There is an open chancel and an oak screen, and rising at the west end of the building is a bell turret.

RESTORATION OF PENDYOLAN PARISH CHURCH, GLAMORGANSHIRE.—The tower of Pendyolan Parish Church, Glamorganshire, has just been rebuilt, and the interior of the building renovated. The church is dedicated to St. Cadoc, and is in the Early Perpendicular style, but the foundations of the tower are Late Norman or Early English. The tower has been rebuilt by Mr. Haines, of Canton, Cardiff; the architects being Messrs. Bruton & Williams, of Cardiff. The re-arrangement of the interior gives increased accommodation for about forty worshippers, and includes the provision of a new pulpit, reading-desk, and lectern.

BOARD SCHOOL, PAISLEY.—A Board School is being erected at Williamsburgh, Paisley, which is expected to be opened early in September. The building is to be constructed of red Ayrshire sandstone, is two stories in height, with basement or underground flat in which the heating apparatus is stored, and measures 128 ft. in length by 80 ft. in breadth. The bottom flat of the school proper is principally taken up with a muster-hall, off which staircases lead to the upper flat. On the east side of this hall is the initiatory department, with the headmaster's room at the north end, and the headmistress's at the south end; while the west side is occupied by four class-rooms. At either end of this flat are ordinary class-rooms, each capable of accommodating seventy scholars. The senior and industrial departments are placed on the upper flat, as are also rooms for the male and female teachers. The ceiling of each of the rooms is 14 ft. in height. Sliding partitions have been constructed in most of the departments. The building will be heated by means of hot air. A gymnasium has been fitted up immediately behind the school, and a workshop has been erected in a separate part of the grounds, in which Sloyd work will be taught. Two large playgrounds have been laid off, and several play-sheds have also been constructed. The work of construction has been carried out under the direction of Mr. Charles Henderson, master of works, Paisley. The architect is Mr. T. L. Watson, Glasgow.

FOREIGN AND COLONIAL.

FRANCE.—The committee which has been formed to erect a statue of Watteau at Nogent-sur-Marne, has now definitely decided that the statue should be erected in the Luxembourg garden.—"The Exposition Internationale du Progrès" is to be opened at the Palais de l'Industrie on the 22nd of this month.—The Louvre Museum is taking the opportunity, on the occasion of the inauguration of the Salle des Antiquités Africaines, on the 10th of August, to celebrate the hundredth anniversary of its foundation. *Journal Officiel* publishes the programme of the "utilité publique" in favour of the prolongation of the line from Moulineux up to the Esplanade des Invalides, and it is probable that the railway company "de l'Ouest" will commence the necessary works very shortly.—The town of Argenteuil has opened a competition for the construction and arrangement of a large abattoir.—The design by the Duchesse d'Uzès which has obtained the prize in the competition for a monument to Emile Augier comprises four groups placed against the four sides of a pedestal, on which will be placed a statue of the celebrated dramatist. The monument will be placed on the Boulevard de Valence, which overlooks the Rhone, and is opposite to the château de Crussol, the ancient seat of the d'Uzès family.—The Champ de Mars Salon closed last Monday.—On Thursday last the statue of Claude Chappe was inaugurated on the Boulevard St. Germain.—Last Sunday took place at Tarare (Rhône) the inauguration of the statue of Simonet, the founder of the muslin industry. The monument is the work of a Lyons sculptor, M. Bailly.—The third annual art exhibition at St. Germain-en-Laye (Seine-et-Oise) will open on the 27th of this month, closing on October 1.—The Special Committee of the Chamber of Deputies has adopted the scheme drawn up by the municipal engineers, MM. Humblot and Bechmann, for the "assainissement" of Paris and of the Seine. The scheme will cost 17,500,000 francs, which will be covered by a loan.—The sculptors MM. Ernest Barrias, Antonin Mercié, and Tony Noël have been appointed members of the jury, which is charged to decide, at Prague, the competition opened for the erection of a monument to John Huss.—The formal inauguration of the statue of Joan of Arc at Chinon is fixed for July 30; and on the same day will take place the inauguration of the statue of Bayard at Mézières.—M. Paugoy, architect, of Marseilles, has been appointed general secretary of the "Association

Provinciale des Architectes Français," in place of M. Gillet, who has resigned.—M. H. Leboucq, architect, of Paris, has obtained the first premium in the competition opened by the Municipality of Toulon for the construction of a group of school buildings. The second premium was awarded to M. Alexandre Marcadier, architect, of Montpellier.—M. Camille Ruphy, President of the "Société des Architectes du Dauphiné et Savoie," has died at Annecy. M. Ruphy, who was "Architecte des Bâtiments Civils" for Upper Savoy, was one of the original founders of the architectural society of which he was President. Among his principal works may be mentioned the "École Nationale d'Horlogerie" at Cluses, the "École Normale" at Bonneville and that at Rumilly, and the Hôtel du Montauvert.

BERLIN.—Professor Karl Becker has been re-elected President of the Prussian Royal Academy, which office he has held since 1892.—Professor Anton von Werner has just completed his large historical picture which illustrates the opening of the first Imperial Parliament by the Emperor William I. It will be exhibited at the International Art Exhibition.—A fine piece of mosaic has been presented to the English Church by Empress Frederick. The English colony have given the church a new window, which has been designed by Herr Geiger, of Freiburg.—Some extensive alterations are now being made in the front of Schinkel's Royal Play-house. The remodelling of the back of the house, which included a new stage, has but lately been completed. The theatre is to be re-opened in September.—After the Emperor's decision in favour of the electric elevated railroad the authorities have decided to give Messrs. Siemens & Halske all facilities for getting to work at once. The railroad is to be opened by January 1, 1895. The main line forms a connexion from east to west on the south side of the city. Branch lines are to run northwards.—Herr von Grossheim, of the well-known firm of architects, Messrs. Kayser & von Grossheim, has been made a titular "Baurath." The distinction is considered to have been given somewhat late in the day.—The Census of Mark, which was the scene of a serious fire some time back, has been extended. The new blocks are larger than the original halls, and show every modern convenience. A part of the new extension was opened on the 1st inst.—A valuable travelling studentship has been put at the disposal of the Prussian Academy of Sciences for the encouragement of archaeological study. The studentship will be known as the "Gerhardt Bechmann." A competition for designs for a "colony" of artisans' dwellings has been decided. Messrs. Schreiterer & Below, of Cologne, won the first premium.—Owing to the large number of accidents with lamps, some elaborate experiments have been made under the auspices of the municipal authorities as to the relative merits of various burners, wicks, &c. The results of the experiments have been published, and the sale of the more dangerous forms of petroleum lamps will be prohibited. The bad fitting of wicks seems to cause most of the explosions of petroleum lamps.—Hamburg is to have electric tramways. The wires will be overhead, the necessary posts are to be architecturally treated.

MUNICH.—The fiftieth anniversary of the formation of the Munich Art Society has been celebrated with much pomp, the chief event to mark the occasion being the ceremony of laying the foundation-stone of the new Artists' Home. The Munich modern school of painters unfortunately held aloof from the celebration.

VIENNA.—It has now been definitely decided to open a large international art exhibition in Vienna next year. The management of the exhibition will be in the hands of the local society of artists. The opening day will be the 1st of March, and the duration of the exhibition three months. A number of valuable prizes and medals are to be given, and the Government will patronize the enterprise.—Another new theatre is in course of erection, the necessary funds (some 70,000*l.*) having been voluntarily subscribed by about 500 citizens. The theatre will be known as the Raimund Theatre.

MISCELLANEOUS.

STABLE FLOORING BRICKS.—We have received a specimen of a new flooring brick, "Durrans' Patent," made by Mr. Edwards, of Rushmore. The requisite roughening of the surface for foothold is obtained by corrugations forming a wave line in section, and arranged in groups of three places at right-angles to each other; the jointing is made in the hollow of one of the corrugations, and a projection of $\frac{1}{4}$ in. on the lower part of the brick ensures a uniform $\frac{1}{4}$ in. joint throughout. The general surface of the floor is in no way interfered with or disturbed by the jointing, and the corrugations form a uniform surface with no sharp edge or corner anywhere. The brick seems calculated to make an excellent stable floor.

ILLUMINATIONS ON THE 6TH.—Messrs. W. Sugg & Co. ask us to mention that they carried out the illuminations, for the night of July 6, at the Law Courts and Burlington House Branches of the Bank of England, the Union Bank of London, the Cordwainers' Hall, and the Institution of Civil Engineers.

PANVER ALLEY, NEWGATE-STREET.—We notice that upon the rebuilding of two houses on the east side of Panver-alley, the sculptured figure of the Boy and Panver has been again set up in the wall, very near to its original position. The stone—for which it is said an American visitor offered 50*l.* to one of the workmen a few months ago—formerly lay level with the pavement, but is now raised so that the inscription is level with the eye, and less likely to suffer injury from the traffic.

ATLAS ASSURANCE COMPANY'S OFFICES.—Mr. Waterhouse is superintending the interior reconstruction and the enlargement of the company's premises. These stand in Chapside, between the ends of King-street and Ironmonger-lane, and were built of granite and stone, by Cubitt, in 1839. The company have taken temporary offices in the new buildings that have lately been erected on the site of St. Olave's, Old Jewry, whereof the tower alone has been preserved.

PUBLIC IMPROVEMENTS AT HEYWOOD, LANCA-SHIRE.—Mr. Frederick Herbert Tuller, City Inspector of the Local Government Board, opened an inquiry at Heywood on the 5th inst. into the Corporation's proposal to borrow 41,500*l.* for sewage purposes, 26,850*l.* for private street improvements, 10,000*l.* for technical instruction purposes, 2,500*l.* for public baths, and 300*l.* for public weighing machines.

THE ELECTRIC LIGHT IN MANCHESTER.—The Manchester Corporation have been engaged for some time in preparing to supply the electric light to tradesmen, &c., in the centre of the city. It is stated that the work is now practically finished. It will be used in the Town Hall and other public buildings.

A NEW BATH.—We have had an opportunity of seeing, at the works of the Sanitary Bath Company, Limited, Camden Town, a new bath. It is, we understand, a Canadian invention, which, having been largely used in Canada and the United States, is now being introduced into this country. The chief point in the bath is that the body is made of sheet steel, lined with copper. The copper is tinned on the surface which forms the interior of the bath, the tinning being done by a new process which is stated to be thoroughly durable. The tinned surface is smoothly planished and brightly polished, and resembles, in fact, electro-plate. The internal surface of the steel body or casing is painted before the copper lining is placed in it. The advantages claimed for the bath are that there are no repairs to cracked enamel, and no repainting, to be done; that the metal does not chill the water as cast-iron or enamel does; that the bath is easily kept clean and bright, and always looks inviting; and that the whole is light, not unsightly, and needs no boxing-in. It is made to stand on raised legs, and is provided with a mahogany rim. Its exterior is capable of being decorated in any style. Supposing that the tinning is really durable and permanent, the bath appears to us to be one which is well worth the attention of our readers.

HOLLOW WALLS.—We have received a description and illustration of "North's Appliance" for keeping the cavity in hollow walls clear of rubbish as the work goes up. The appliance consists of two battens or strips of wood of any required length, and about $\frac{1}{2}$ in. by $\frac{1}{2}$ in. with chamfered edges, connected at the bottom by a strip of canvas about $\frac{1}{4}$ in. wide, and wedged into the cavity by either a block of wood, a piece of brick, or any other suitable means, and thus held in position. For taking the appliance out of the cavity, the blocks or wedges are knocked into the bag or sack, and the appliance is lifted out by means of a cord provided for the purpose at each end; it will then be found that the battens will close together, and the whole is lifted out clear of the walls and emptied ready for further use. By this means no holes are required to be left at the bottom of the cavity for cleaning-out purposes, and there is no making good to do afterwards. It appears to be a useful thing, provided that workmen and foremen can be induced to take the necessary trouble to place it and shift it effectually. The invention would, however, only be applicable where ties are not used.

MEMORIAL TABLET, ALL SAINTS' CHURCH, DULVERTON, SOMERSETSHIRE.—A memorial tablet to the late Vicar of Dulverton has been placed in the chancel of the parish Church of All Saints. The tablet is of white Castalini marble mounted upon surroundings of veined and polished alabaster. Above all is the family crest and a ribbon bearing the motto, "Qualis vita finis ita." The work has been carried out by Messrs. Harry Hems & Sons, of Exeter.

THE "HOMACOUSMIC" SPEAKING TUBE.—The contrivance called by this name, invented and patented by Mr. H. A. Culmore, engineer to the "Homacoustic Speaking Tube Company," is the speaking tube on the same principle as the ordinary speaking tubes in common use, but differing materially in the manner of its arrangement and adaptation for use. First, the signal to speak is not made by blowing down the tube, but by applying the hand to a plunger which compresses the air in a gutta-percha ball, the whistle being a fixture at each end and quite independent of the mouthpiece. Thus the speaker can never have the annoyance of the whistle at the other end being off, or of receiving a puff in his face from some one calling him just as he

THE CARLISLE PLUMBERS' DISPUTE.—The journeymen plumbers of Carlisle, who in March last struck work for an increase of wages from 7½d. to 8½d. per hour, agreed recently with the masters to refer the question of wages and various other

LONDON: 352 to 364, EUSTON-ROAD N.W., and
218 and 220, HIGH-STREET, BOROUGH, S.E.

LIVERPOOL: 6 and 8, HATTON GARDEN.

GLASGOW: 47 and 49, ST. ENOCH'S QUAY.

ILLUSTRATIONS.

Sculpture in the Paris Salon, 1893 { "Poésie Héroïque,"—M. Falguière, Sculptor.....	Single-Page Ink-Photo.
{ "L'Architecture"; Statue for the Tomb of the Architect Guérinot.—M. E. L. Barrias, Sculptor.....	Single-Page Ink-Photo.
The Institute of Chartered Accountants: Part of Frieze, &c.—Mr. J. Belcher, F.R.I.B.A., Architect.....	Single-Page Ink-Photo.
Corner of Institute of Chartered Accountants' Building.—Mr. J. Belcher, Architect.....	Single-Page Ink-Photo.
Proposed Hotel, Madeira.—Mr. Henry Rose, Architect.....	Two Single-Page Ink-Photos.
Design for Clarence Memorial Wing, St. Mary's Hospital, Paddington.—Messrs. Salter & Adams, Architects.....	Double-Page Photo-Litho.

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Plan of Proposed Hotel at Funchal, Madeira.....	PAGE 68
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Megalopolis.



HE first "Supplementary Papers" issued by the Society for the Promotion of Hellenic Studies* constitute perhaps the most valuable volume which the

Hellenic Society has issued. The proceedings are in reality those of the British School at Athens, published at the cost of the Hellenic Society, the "School" not having sufficient funds to bring out such a work; for though called by the modest title "Supplementary Papers," the publication is really the largest, as far as we remember, which the Hellenic Society has issued; a folio volume with 141 pages of letterpress and a number of large plates giving measured drawings and views of the remains at Megalopolis, with a general plan of the site.

This latter is drawn by Mr. Loring, and enables the reader to see at a glance the relative situations of the principal remains. The ancient Megalopolis lay on both sides of the river Helisson, which, with an average width of about 200 yards, winds across the middle of the site, the probable line of the ancient city walls being marked as enclosing a large area north and south of the river. Sinadou, the modern town, lies to the south-east, just outside of the ancient wall line. Close to the river, on the south or left bank, is the site of the famous theatre, the concave of the vast auditorium facing northwards, and opposed by the large rectangle of the Thersilion, the nearly square columned hall, called after the name of the man who built it, and the portico of which adjoins the back of the stage of the theatre, forming a kind of proscenium decoration to it. On the north of the river, also near the bank, are the remains of the Stoa of Philip, the Agora (or its site), and, close on the north bank, the supposed temple of Zeus Soter. The road from Karytaena, which crosses the site of the ancient city from north-

west to south-east, is carried across the river by a bridge rather more than 300 yards eastward of the Thersilion, which (having reference to the usual persistence of bridge sites) we may probably assume to represent the point at which the bridge necessary to connect the two portions of the city always existed, especially as this is the narrowest point of the river within the city boundary. We do not observe mention made of any attempt to look for remains of an ancient bridge, which would be a matter of some interest, but of course this is a more difficult undertaking than trenching on dry land, and requires special means, particularly if the river is a rapid one.

We need hardly remind our readers that one principal point of interest in connexion with the researches at Megalopolis has been in regard to the bearing of the remains of the theatre on the discussions started of late years, by Dr. Dörpfeld principally, on the question of the Greek stage, or rather as to whether the Greeks had an actual stage or not. As to what has been previously said in our columns on this subject, we may refer the reader to an article on the excavations at Megalopolis in the *Builder* for June 14, 1890, and various further "Notes" of March 7, 1891 (page 185), April 18, 1891, (page 305), and April 25, 1891 (page 326). The remarks and suggestions made there are however to some extent superseded by the present fuller information in the volume before us, but they indicate some incidents of the controversy. We shall endeavour here to give some idea of how the argument now stands as far as the Megalopolis Theatre is concerned, with the fuller information and plans now before us.

The chapter dealing with the plan of the theatre is jointly signed by Professor Gardner and Mr. Loring, and contains a great deal of very careful and interesting reasoning on the facts given in the description and the plans, which however does not bring us so near to a solution of the main point as we had hoped. It is impossible to go into all the details here, but the main facts may be summarised intelligibly. We have the south wall of the Thersilion, about 230 ft. long, facing and on the central axis of the curve of the auditorium. From this wall projects a portico of fourteen Doric columns on the face, and projecting two intercolumniations from the wall (towards

the theatre). In the main wall behind the colonnade are three doors symmetrically spaced, showing at all events that the Thersilion was intended to connect with the theatre. The stylobate finished in two steps, returned round the sides of the portico to the main wall. But in front of the portico, and not returned at the angles, are four more steps, the lowest a shallow half-step, leading down to the ground level, which steps are described as obviously of later date than the stylobate of the portico, being much more roughly worked and set, with different form of metal cramp and a different tooling.* These steps moreover have no solid foundation, and the masonry of the original stylobate has been cut into in inserting them. Without these steps there would be a drop of about 4 ft., more or less, to the orchestra level.† We are then, as the writers put it, confronted with the question, what was the relation of the Thersilion to the theatre *before* these steps were added: *when* were they added; and *why* were they added? This of course leads to the consideration of the relative dates of the Thersilion with its portico, and the theatre. The portico being built facing the site of the theatre, it seems manifest that the two were built together, and in relation to one another; as Messrs. Gardner and Loring point out, "it would be absurd to suppose that the Thersilion was built, without reference to any theatre, in a position exactly adapted to the addition of a theatre, by the side of a hill, and with the portico, its main entrance, turned away from the Agora‡ and facing the hill." The authors consider the date of these lower steps of the portico fixed by an inscription on a certain pedestal, which (the inscription) they say can hardly be assigned to an earlier date than the second century B.C.:

* These are the steps which are referred to in the "Note" in *Builder*, April 18, 1891; but the perception as to the real facts in regard to them has been materially modified since then.

† The writers think that the present front row of seats of honour, or "stalls," in the auditorium, was an addition to the original auditorium seats, and that the level of the orchestra was lowered by the height of one step when this row of seats was added. This would leave the stylobate 4 ft. 6 in. above the orchestra level. This question about the added line of seats we can only note in passing; but we are disposed to think the conclusion is correct.

‡ In regard to this argument, it may be answered that the Agora is on the other side of the river. However, the distance is only about 350 yards between the two, so the Thersilion would be a conspicuous object from the Agora.

* Society for the Promotion of Hellenic Studies. Supplementary Papers: No. 1. Excavations at Megalopolis, 1890-1891. By Ernest A. Gardner, William Loring, G. C. Richards, and W. J. Woodhouse. With an architectural description by R. Weir Schultz. London: Macmillan & Co.

this pedestal bears marks of a special character of tooling also found on the lower steps of the portico. So that, taking the generally assumed founding of the Thersilion and the theatre along with it at 370 B.C., we have the case of a portico, manifestly having relation to the theatre, and with doors entering upon it from the Thersilion, but existing for about two centuries with a drop of over four feet from the portico level to the orchestra of the theatre. What then was the use of the doors between the Thersilion and its portico, which led out only on to the top of a sunk fence, as one may say, and to which there was no access from the ground except by an acrobatic feat?

The explanation offered is very ingenious, and may be the true one, but after all it is only conjectural, for there is not a shadow of proof for it, only the argument "how can we explain it in any other way?" The authors suggest, then, that in the earlier period there was a permanent bank or terrace of earth in front of the stylobate wall of the portico, which formed the stage, and which, though it hid the front of the stylobate wall, would nevertheless not remove the structural necessity for such a wall. There would be external steps to this terrace, both for connexion between stage and orchestra and for access to the Thersilion. At a later period the terrace was removed and a temporary wooden stage used, which would also have temporary steps; but at times when this platform was removed and not in use, steps would be required to ascend to the Thersilion portico, and were therefore added where we now find them, in a somewhat rough manner, as would be natural in the case of steps which would be covered over whenever the temporary stage was used, and which in any case were only added for a purely practical purpose.

As far as the idea of the early terrace is concerned, it must be admitted that this is a very conjectural explanation; but if this explanation is accepted, it is evident that the actors must have been *on* this terrace, and not in front of it; at all events that the height of it was not sufficient to provide the scenic background of Dr. Dörpfeld. But in regard to the idea of the later wooden and removable stage, the remains afford a confirmation of the theory. About 20 ft. in front of the stylobate of the portico there exists another line of foundation wall, on which are some of the bases of a smaller colonnade. This colonnade we may dismiss for the moment, to consider what was revealed by Dr. Dörpfeld's own acute observation of the two courses of stone which form the foundation of it. "The lower course is structurally somewhat better than the upper," and this fact alone suggested to him that the two courses were perhaps not of the same date. "On the removal of some blocks of the upper course this suspicion was found to be amply justified, for on the blocks composing the lower course was discovered a series of rectangular sinkings and of grooves clearly intended for the reception of wooden posts and planks." These appearances are carefully figured in one of the plans, and this seems a remarkable confirmation of Messrs. Gardner and Loring's idea as to the removable wooden platform. But over this course of stones pierced for wood work, and therefore later than it, was placed the course of stones which bear several bases and drums of a small colonnade. This the authors regard as the front and support of the Vitruvian stage. These columns are roughly worked, and on either side of each column is a projecting fillet, "doubtless intended to hold panels which formerly filled the inter-columniations." The shaft of one of these columns, a monolith, has been found apparently entire, and gives a minimum height of 7 ft. 8½ in. for the front of this latest stage. This front would be high enough to act as Dr. Dörpfeld's back-scene. The authors give, however, two reasons why it could not have filled such a purpose. First, from the positions of the fillets on the sides of the columns, the front could not have been

a flat surface; the columns must have projected in front of the panels. We do not see very much in this argument; such a back-scene might have been formed of half columns and panelled spaces between. But another and stronger reason against the idea is that there is no trace of a door or opening anywhere, either from a wider spacing of the columns, or from any special appearance on any part of the base-course of masonry, which must have shown a difference of appearance where any portion of it had been used as the sill of a doorway; and it is argued by the authors, and we think with truth, that it is impossible to conceive of a wall used as a scenic background for the actors, without any door entering on to the orchestra. It then follows that this latest addition in front of the Thersilion portico represents the front of the Vitruvian high stage or *λογίον*, and another argument in favour of this idea is that it was built on the base-line of masonry which had undoubtedly at a former period been the basis for a wooden stage, or for some kind of wooden erection which we can only account for by supposing it to have been a stage. The curious part of the matter is that this erection, over 7 ft. high at least (on the evidence of the monolith column), and probably 8 or 10 ft. over all, must have risen several feet above the base of the colonnade of the Thersilion portico behind it, and have shut out part of that from sight. Anything more unsightly than this it would be difficult to imagine, and one can only come to the conclusion that the desire for a stage according to the then received pattern was a sufficiently important object to override any consideration of architectural effect in regard to the older monumental portico in the rear of the stage.

The foregoing considerations are evidence in favour of the idea that when Vitruvius spoke of the *proscenium* he spoke of a platform upon which the actors stood, and not the front of an erection which formed a back-scene to their acting, and the probable height of this particular stage agrees pretty nearly with the height required by Vitruvius. The depth backwards to the Thersilion colonnade would indeed be much greater than is required for his description of the Greek stage; but the authors suggest that there is no necessity to suppose that the floor of this high stage extended all the distance back; that it is more probable that it was an erection in front of but not touching or interfering with the colonnade of the portico. This supposition would at least leave the colonnade complete in the rear of the new stage, though the whole of the height of the columns could not be seen from the front of "the house."

This theory as to the height and construction of this later (probably late second century B.C.) stage at Megalopolis supports the idea that Vitruvius, in his description of the Greek stage as he *knew and understood it*, did mean by "*proscenium*," a stage on which the actors stood, as the indications of the remains agree with that better than with any other supposition. But the discoveries at Megalopolis, and the deductions so cleverly argued from them by Messrs. Gardner and Loring, after all do not carry us further than to support the generally received idea as to what Vitruvius means by the Greek stage as he described it. They take us little or no nearer to the question, what was the actual stage of the best Greek period, and whether it was really, at that date, what Vitruvius described it in his own day. Messrs. Gardner and Loring really only take us as far as this—that a terrace in front of the Thersilion portico is a perfectly possible explanation of the relation between the Thersilion and the theatre, but is a mere conjecture with nothing else to support it; but that, on the other hand, the Megalopolis remains offer nothing whatever, so far, to support Dr. Dörpfeld's theory that the *proscenium* was only a background. The drop-wall beneath the Thersilion portico (before the later steps were added), facing the theatre, might seem at

first sight to support this view, but then the wall is too low; it is impossible to imagine a wall at the most 4 ft. 6 in. high being accepted as a back-scene; and even if it were, whence did the actors have access to the orchestra, on which they (according to Dr. Dörpfeld) were supposed to act? So far, we think it may safely be said Megalopolis gives Dr. Dörpfeld no support at all; and the plans and sections of the remains, appended to this treatise, have been evidently carefully and conscientiously drawn, and represent all that is to be made out of the remains, unless some further excavations throw additional light on their meaning.

Professor Gardner adds in an appendix some very interesting illustrations of representations of the Greek stage on vases made in Southern Italy in the third and second centuries B.C. Some of these confirm in a striking manner the opinions expressed in regard to the Megalopolis stage. We have the simple terrace platform; the stage with steps in front or staircase at one point (not a continuous row of steps); and a front of a stage with columns or pilasters, which suggests the latest stage at Megalopolis.

Among the peculiarities in the plan of the theatre is that there is only one *parodos*, on the east side, the corresponding space on the west being occupied by a long narrow chamber on a line with the front of the stage, which has been called *σκαυθίκα* (scene-dock). This idea would seem to imply a greater variety of scenic background than we are used to imagine in connexion with the Greek Theatre. It looks like a store-place of some kind, but the destination supposed for it can only be regarded as a conjecture.

The Thersilion presents us with a very peculiar plan. It is an oblong interior, not very far from square, with four columns at four angles of a square near but not on the centre (nearest to the south side facing the theatre); on the east, north and west sides the space between this central compartment and the side walls is divided into five equal aisles by four rows of columns, which are not placed opposite to each other in lines normal to the side walls, but arranged so that they form lines converging towards the centre of the square compartment. On the south side this arrangement is not followed, but the columns are placed opposite those which originally stood in the wall line next the theatre.* It seems obvious from this arrangement that whatever formation took place in the hall had its centre of interest in the square space marked out by the four central columns. The others were arranged so as to afford a number of uninterrupted vistas from the sides.

Mr. Schultz's architectural description, in connexion with which the restored plan of the Thersilion is given, contains a great deal of interesting information on the architectural and structural details of the building, for which we must refer the reader to the book, which is one that every one seriously interested in ancient architecture ought to procure. Whether we agree or not with the critical views expressed in it, we cannot but recognise the care with which the investigations have been made and illustrated, and the thoughtful and logical character of the analytical discussion of the subject.

A LADDER CRAMP.—Messrs. Buckley & McCormack send us a description and illustration of an adjustable cramp for fixing ladders wherever there is a window-sill or window-head available near the top of the ladder. The cramp has a double arm with hooks which go round the sides of the ladder; the other end of the shank from which the hooks branch has a turn-down holding plate which presses against the wall on the inside of the window, and is tightened up by a screw, thus cramping wall and ladder together. By turning the cramp the reverse way up, it can be applied at the head of a window on the same principle as at the sill.

* The wall with three doors in it before spoken of, which separates the portico from the hall, was not the original arrangement; the hall was formerly open to the portico except for four columns ranging with the interior colonnade, the loosening of which have been found. These did not, however, range with any of the outside columns of the portico.

A CHAPTER ON GREEK VASE-PAINTING.

DR. HARTWIG'S great work on the Meisterschalen—i.e., the cylixes which are signed with artists' names, has been long expected, and will disappoint no reasonable expectation. Its publication marks a distinct epoch in the history of the study of Greek vase-paintings.* In his preface he tells us that the work is due to chance, not to a fixed plan—it has grown up bit by bit, and the original intent has been modified *ambulando*.

The initial impulse was given in 1887 by the discovery, in Rome, of a number of unpublished vases with artists' signatures, with dedication inscriptions, of which last more anon. The first idea was to publish these as a Supplement to the German Archaeological *Jahrbuch*, and to regard this as a sort of completion to the Vienna *Vorleseblätter*. Dr. Hartwig next came across the Branteghem and Bourguignon collections, both, especially the first, so rich in signed vases. To these were added later the Bruschi collection at Corneto, well-known to all archaeologists, but usually inaccessible to the intending publisher, the splendid Fania collection at Orvieto, and that of Lord Northampton at Castle Asby. As the work went on it was borne in upon him that some of the finest vases left us are unsigned, and yet, by various notes of manner, may be attributed to certain masters who have left us signed works. So, bit by bit, the book developed from being, as originally intended, a corpus of actually signed vases, to be a history of individual artists, and of their mutual relations and influence, a history based on unsigned, as well as signed, work.

Here, we may as well at once say, seems to us the weak side of the work. Dr. Hartwig is perhaps unduly eager to give an artist's name to an unsigned vase. The temptation is great, but surely it would be wiser in the case of unsigned vases to be content with the simple formula, "in the style of," or "under the influence of." A potter would have in his workshop a number of subordinates. What more natural than that, especially in the early days of their apprenticeship, they should even deliberately affect their master's style? It seems even possible that with the artist's signature affixed we are not quite safe, as, if executed under his immediate supervision and issued from his factory, the head potter might very likely sign for commercial reasons, and this would account for the wretched work that sometimes appears in a vase signed by an illustrious name.

One other point, and we have done with objection. Dr. Hartwig, intent on the question of development, even discovers in some of the vase-painters two distinct periods, pre- and post-Persian (to use a Germanism), the early and the late "manner" as we should say. Here again, we are it seems to us on slippery ground. Except where dedication names give us some foothold, chronology cannot safely be pressed to such detail. There is nothing to hinder an artist from lapsing into occasional archaism, prompted sometimes by subject, sometimes from mere mood. Even the form of letters in inscriptions must not, for the same reason, be too closely pressed.

To return to the plan of Dr. Hartwig's work. In publications drawn from sources so diverse the plates are necessarily, he warns us, unequal. It is not easy always to lay hands on a competent artist in a small provincial Italian town. Some of the plates are models of perfect reproduction, and the general level is high. No chromatic reproduction is attempted, and we think wisely; it is quite easy to reconstruct in imagination the simple black and red. The vases are all reproduced in the original size, a matter of great importance. Inscriptions are given in small letters. This also is a sensible inno-

vation, as half-facsimile is only misleading. The shape of the vase is only added when it is of scientific importance.

As to the limits of the book, they are strict. Dr. Hartwig confines himself to the "Blüthezeit"—the fine period—that is, Euphronios and his set, with Chachryllon as forerunner. He holds out hopes that another volume will deal with Epiktetos and his set, who preceded Euphronios, and we may hope he will then include the black-figured masters who signed their work. For the present, Epiktetos has to be content with a valuable chapter on his relation to his successors.

As regards his attitude towards his subject, Dr. Hartwig approaches it from the art-critic's point of view; the mythologist learns nothing, the question of interpretation is hardly touched on, and when it does come up is dealt with entirely from the point of view of the development of the same type by different masters. The author hopes his book will be consulted by artists, who, as a rule, know but little of the beauties of Greek ceramography. The introduction deals with the question of the dating of vases. Blunders as odd as protracted have been made about this. Greek vases started under a cloud, as Etruscan. Long after the "Etruscan" fallacy died, its baneful effects lived on in a certain depreciatory attitude of mind towards these vases, as curious and strange rather than beautiful objects. The elegance of their shape was approved, but the work of the greatest masters in decoration was stamped by archaeological judgment as archaic. The florid and tasteless productions of fifty years later have the prominent place in the glass cases of the period. A curious fallacy prevailed that these vases of the best period, supposed, though wrongly, to be contemporary with Pheidias, being mere handicraft, lagged far behind the development of plastic art.

All this is now, of course, matter of dead and gone criticism. We know now that the finest things in Greek vase-paintings, the fullest development of the red-figured style, was a thing accomplished many years before the date of the Parthenon marbles. The odd thing is how we came *not* to know this as long ago as 1835. In that year Ludwig Ross, making tentative excavations in the Acropolis, to the south of the Parthenon, came upon a layer of partially-burnt *débris*, which he had no hesitation in declaring marked the period of Persian invasion. Among this Persian *débris* was the fragment of a plate in the finest red-figured style; a style which he rightly concluded must have been fully developed before the Persian invasion. His discovery, conclusive as it was, fell practically dead. Subjective critics were taken with the notion that the outburst of patriotism after the Persian war, the impulse given to national life, found its expression in the greater freedom of the red-figured style, a sentiment easy to work up rhetorically, but foolish enough when critically considered. This error landed us in another perhaps more troublesome. Dating the red-figured style as contemporary with Polygnotus we were set hunting for his influence; was his *ethos* discernible in this or that vase executed, as the new chronology teaches us, before Polygnotus was thought of? So too with the influence of the drama, we were fifty years wrong all along the line. It needed the recent excavations of the Acropolis to put an end to the mistake that Ross had barely suggested. These excavations show that vases in the style of Brugos and Hieron, and a portion of those by Euphronios Duris, and yet more of Epiktetos, were executed before the Persians set foot in Athens. In 480 B.C. the red-figured workers had already done some of their best work. This meant that Euphronios, the best and first of them, must have been at work about 500 B.C.

The next important question of doubt is that which deals with what the Germans call "Lieblungsnamen," a mistaken term already creeping into English usage in the form of "love-names." We prefer the term "dedica-

tion names." For a strictly limited period of time, of the late black-figured and early red-figured technique, the custom obtained that the potter should inscribe on his vase the name of some popular favourite, usually a youth, with the adjunct "is beautiful." "Leagros is beautiful," "Mennon is beautiful"—or the blank formula, "the boy is beautiful"; sometimes, though very rarely, "the girl is beautiful." "For a good boy," on the mugs of our childhood, offers a certain analogy; but with the Greeks the notion is of celebration, not reward, and beauty takes the place of moral excellence. In the early part of the sixteenth century of Italy we find analogous inscriptions—"Lucrezia bella," "Angelia diva"—but the persons toasted are always women. The term "love-names" is based on the groundless assumption that in *ὁ παῖς καλὸς* we have a note of the Dorian relation of lover and loved. Say we have the echo of that note, that is the most. Leagros, Glaouk, and the like, who are toasted in these cups, are the noble patrons, not the obscure *παῖδά* of the handicraftsman. It is hard to get the exact shade of meaning. "Dedication" is certainly too solemn; it savours of the sanctuary. "Toast" is too exclusively of the banquet, and, besides, too personal. We also want some hint of the commercial shrewdness involved, as in our "Gladstone bag"—for the wealthy youth was the vase painters' best patron.

The case for the chronology of these "dedication names" is put very clearly. We cannot even resume the details of the argument. Relying on the fact that the boy, even in the larger Greek acceptance of the word as youth, could only so count for about ten years, Dr. Hartwig concludes:—

1. All vases inscribed with the same "love name" by the same artist must be within a period of ten years of his activity.
2. All vases inscribed with the same love-name and by different masters must, in like fashion, be within the same period.
3. The appearance of two different love-names on the same vase justifies us in concluding that the persons named were within about ten years of each other's age. The value of these three dicta for the closer dating of vases is apparent.

We can only draw attention to the main subject of Chapter VIII., in which the vexed question of the meaning of "catagrapha" is dealt with, and the relation of Kimon of Kleonæ and his innovations to vase painting fully discussed. Dr. Hartwig is here at issue with most other authorities, and notably with Studniczka, who held that the painters of the set of Epiktetos reflect the innovations of Kimon. Dr. Hartwig thinks we must look to Euphronios for that which is in theory perspective, in practice foreshortening, of which Kimon was the first to master the principles, and which the critics called the drawing of "catagrapha."

It is in the criticism of detail, the knowledge that comes of careful personal examination and appreciation, that Dr. Hartwig shines. We can only note his rather startling, but, we think, satisfactory theory about the recently rediscovered Troilos vase at Perugia. It is signed "Euphronios made," and as this is the master's usual signature, it has usually been supposed that Euphronios painted it. Dr. Hartwig takes it away from Euphronios and gives it to an artist whom he has almost called into being, Onesimios. In similar fashion he takes away the Eos and Kephelos vase signed by Hieron and gives it to an artist whom he calls quaintly enough "the master with the bald head" (from his figures, not himself). This should delight the realists. For sheer beauty there are few things like the newly-published vase from the Cabinet de Médailles, which he attributes to Brygos.

REBREDOS, ST. MARY'S CHURCH, STREATLEY.—A memorial rebredos in polished white alabaster, elaborately carved and sculptured, has recently been erected in St. Mary's Church, Streatley-on-Thames, from the design of Mr. J. L. Pearson. The work has been carried out by Mr. N. Hitch, of Vauxhall.

* "Die Griechischen Meisterschalen der Blüthezeit des Strengen Kothfürigen Stiles." Paul Hartwig. Text 680. Seiten. 4to. Mit Atlas (75 Lichtdrucktafeln Gross-Folio).

NOTES.

THE Parliamentary Committee which is inquiring into the working of the Railway and Canal Traffic Act has completed the first stage of its labours, and commences the examination of railway witnesses this week. The representatives of the traders and the public all tell of great advances imposed at the commencement of the year—subsequently modified in the majority of cases as a result of the general agitation. In many instances, however, the position is still very unsatisfactory. As a Scotch witness put it, there has been a great deal of appearance of concession, but the result has not equalled the appearance. This, it is to be feared, applies principally where there is lack of organisation, as in the case of agriculturists, small traders, and private individuals. Fortunately, the County Councils presented a good medium for many of these to submit their grievances, nor were members of Parliament behindhand in rendering assistance when desired. A representative of the Swansea Traders' Association alluded to the question of the charges made by railway companies for services rendered at private sidings, and stated that he found it impossible to obtain any particulars from them as to the services included in their charges. There should now be no difficulty in getting the companies to define precisely what they do in the way of terminal and additional services, and this is not the least important of the various questions for the committee to consider. As to future cases of dispute, several witnesses express the opinion that the procedure under the conciliation clause, with something added, would be most effective. It is unanimously agreed that the Railway Commission is far too costly, and there are but few advocates for another brand-new tribunal.

THE outlook in the coal trade—any serious disturbance to which soon affects many other industries—is growing very ominous, and a stoppage appears inevitable. Neither side, however, are fully united as to the policy to be pursued—a fact which will doubtless affect the duration of the coming struggle. A few of the masters have not yet given notice of reduction, while the Durham miners—who have had a bitter experience of strikes—have determined to secede from the Federation rather than run the risk of being ordered to strike again. Some of the lodges in the same county and in Northumberland decided to stand by the Federation in resisting the proposed reduction, and to demand an advance for themselves in addition. The general result of the voting, however, is against coming out—the majority in favour of this course being three to one. The attitude of Scotland and Wales may be characterised as “watchful”—fluctuating between sympathy and self-interest. The reduction demanded by the coal owners is undoubtedly a very sweeping one. They justify it by pointing to the advances granted within the past four or five years, in the light of which a 25 per cent. reduction certainly does not appear so exorbitant. Wages began to go up in October, 1888, with an advance of 10 per cent.; since which date five further advances have been obtained by the men—two more of 10 per cent. and three of 5 per cent. The last advance was in August, 1890, and prices having receded considerably since that date, there is no doubt that little or no profit is being made at the present time. The coal-owners appear to have put off the evil day so long that a reduction of 5 or 10 per cent. will not now meet the case; but the 25 per cent. which they are seeking to enforce is more than any body of men can be expected to concede without a struggle. A solution of the difficulty may perhaps be found in “reduction by instalments,” although the attitude of those branches of the Miners' Federation which have already voted upon

the question is one of resistance to any reduction whatever. It is hardly likely that either side will maintain for long the position taken up at the outset, and it is to be hoped that past experience, and a careful consideration of existing circumstances will help to obviate a prolonged struggle.

ON Monday night London was the scene of a serious fire, such as we only expect to hear of from some jerry-built American or antediluvian Russian harbour town. A large number of well-stocked warehouses in St. Mary Axe were entirely destroyed, and many others much damaged. The actual cause of this conflagration is not yet known, but it is fairly certain that its extension was primarily due to the non-division into risks of the first warehouse attacked, then to the bad construction and crowded position of the neighbouring buildings, and further to the organisation and strength of our fire brigade not permitting of an adequate attendance of appliances and men at once, on a first alarm, to so dangerous a district. Speaking of the latter it appears inconceivable why so fine a body of men should be continually handicapped by defective organisation and irrational means of inter-communication. The seconds alone lost with the separate telephonic communication to each individual station mount up, and the average two minutes' night “alarm” is nearly treble what a perfect institution should aspire to. As usual, the large conflagration did not come alone; another serious one in the Brompton-road, and one at Aldgate, occurring about the same time, thus again giving London a night this summer in which it had three heavy fires, each insufficiently attended, and scarcely an engine left at home to protect the rest of the metropolitan area. In each case the consequences of the three outbreaks were nearly as bad as they could have been.

MANY sagacious men of business have before this predicted that the recent Parliamentary struggle over the Manchester, Sheffield, and Lincolnshire Railway Company's Bill for a main line to London was money thrown away, because it would not be desirable to raise the capital for the undertaking. It appears very much as if this would be the case. For the Board in their half-yearly report say that “negotiations have been entered into with regard to the raising of the new line to London, but owing to the unsettled state of the money market the question has for the present been deferred.” At a time like the present sound home undertakings are much in favour, and we cannot but regard the above quotation as showing that financiers do not consider that the capital can be raised for the new line. The Board of the Metropolitan Railway have over and over again assured the shareholders of that company that the Aylesbury extension would be a success when the main line from the North was completed. At present the construction of this main line appears to be a thing of “the dim and distant future.”

THERE appears to exist a sharp conflict of opinion between the Sanitary Authority for Rickmansworth and the neighbourhood, and the Medical Officer of Health who has reported so unfavourably of the sanitary state of the district that the attention of the Local Government Board has been drawn to the subject. The medical officer considers that a scheme of sewerage and drainage is necessary, but the Sanitary Authority is satisfied with the present state of things. It is clear, however, that a body of amateurs cannot properly set up an opinion against a medical expert, and if they have reason to believe that the views of this officer are either wrong or impracticable the opinion of an impartial expert in sanitary matters should be taken. The increase in

the size of Watford, Harrow, Pinner, and Northwood during the last few years has been very marked, and it is obviously the duty of the Local Government Board to take care that the sanitary condition of Rickmansworth, which belongs to this group of semi-suburban localities, is kept up to a proper standard. Hitherto Rickmansworth has been remarkable for the filthy condition of its highways in winter and their dustiness in summer, and if its sanitary condition is also condemned by experts it is high time that proper remedies were sought for.

WEDNESDAY, the 12th, will be remembered as the first really wet day of the season. However, members of the Archaeological Institute were fairly well under cover in the morning at Westminster Abbey and Lambeth Palace, as reported elsewhere. The evening was devoted to a reception on the invitation of the Lord Mayor and Mayoress at the Mansion House. Invitations to meet the Congress party had been issued to the members of various antiquarian societies, which were accepted in no small numbers. We noticed in consequence a large gathering of archaeologists from all parts of the country, especially from Kent and Surrey. The guests and their friends were received by the Lord Mayor and the Lady Mayoress at nine o'clock, and they then proceeded to examine an important collection of municipal insignia of antiquarian interest. Maces of various English corporations, swords of state, caps of maintenance, silver oars, mayoral and other chains of office, were arranged in a long line of glass cases from one end of the Egyptian Hall to the other, and also in the Western Parlour. Of these, the most important object was the celebrated crystal sceptre of the City of London. While other objects had their observers, a small crowd of sightseers awaited their turn to inspect this unique article. The gold mounts and pearls may be of Saxon date, but the gold head and its rubies and sapphires is obviously much later. By its side and around it was the City Purse—all too small for modern use—the Lord Mayor's collar of SS bequeathed by Sir John Alen in 1545, the various swords of state, the ward maces, thirty in number, &c. The maces of the English cities and towns were arranged chronologically, by the care of Mr. St. John Hope and Dr. Freshfield, a task that must have been lessened in its labour from a similar gathering having been made at Burlington House by Mr. Hope some months ago. The early maces were represented by the small and curious fifteenth-century examples from the towns of Winchcombe, Hedon, Grantham, and Stratford-on-Avon; the latest, by those of Shrewsbury, Wolverhampton, and Cambridge. Here was also the great silver oar of the Admiralty of the Cinque Ports and many others. The Burghmote horns exhibited were curious, many being of early date. Among them was the wakeman's horn from Ripon, together with the bawdrick, with its well-known and curious silver badges, now worn by the Serjeant-at-Mace. It is to be regretted that this remarkable collection was such a short time on view. During the evening the Mediæval Musical Society rendered a selection of quaint old music, and music played on the harpsichord and viols was also given. It is to be hoped that these concerts may be repeated on some future occasions.

AN interesting exhibition has been held during the present week at 83, Eccles-ton-square (by permission of the Marquis of Bute), consisting of drawings in water-colour, photographs, and fragments discovered at the tombs of Beni Hasan, El Bersheh, Tel-el-Amarna, Sheikh Said, and Der-el-Gebrawi, executed for the Archaeological Survey of Egypt by Messrs. Percy Buckman, W. M. Blackden, John E. Newberry, and Howard Carter. The chief drawings in the collection are a series of

full-size water-colours of the wall paintings from the tombs at Beni Hasan. Many of these have figure subjects, treated in the conventional manner of the period, but exhibiting a considerable knowledge of anatomy and the power to depict objects in motion. Single figures holding various objects, groups playing games, and figures of priests are amongst the number. Other drawings exhibit various kinds of animals and birds, notably a large variety of duck, some of which are excellent examples of decorative treatment. Two curious specimens of dogs and a cat are also given. A group of wrestlers bears a striking resemblance to some of the casts made of those who fell at the overwhelming of Pompeii, preserved in the Museum there and at Naples. The lotus, of course, plays a prominent part in the decorations; a particularly happy example is its use as a head-dress on the figure of the daughter of Tahuti-hotap at El Bersheh. There is a curious representation of salting fish from a tomb wall painting at Der-el-Gebrawi. Besides these reproductions of wall paintings are a number of water colours illustrating the country in the immediate neighbourhood. These are mostly by Mr. Percy Buckman. Amongst the most striking are two views of the Plain of Tel-el-Armana, and a view across the Nile Valley at Der-el-Gebrawi. There are also several fragments of wall showing decoration, the figures and other sculpture being in very low relief. Also specimens of scarabs, part of a ball, and other objects of blue glaze of a very beautiful colour, with patterns in black, from Der-el-Bahari. The result of the explorations in the first fourteen of the tombs at Beni Hasan (there are thirty-nine tombs in all) has been written by Mr. Percy E. Newberry for the "Archæological Survey," and published by Messrs. Kegan Paul & Co., and will prove interesting to all those interested in Egyptian research. It is very freely illustrated with plans of the tombs and *fac-similes* of the wall painting reduced from full-size drawings and tracings.

THE Japan Society, which brought its second session to a close on Wednesday evening, and its tenth ordinary meeting, was supported by a large number of members and guests. An interesting and instructive paper on "Wood and its application to Japanese Artistic and Industrial Design," was read by Mr. George Cawley, M.Inst.M.E., late of the Imperial Engineering College, Tokio. The subject was a particularly interesting one, and the interest was increased by various demonstrations during the lecture of the English and Japanese methods of performing similar simple operations of carpentry and joinery. Mr. Mizutani Takichi, a Daiku master carpenter and joiner, showed the Eastern methods, and his picturesque native dress and Oriental attitudes and tools attracted the closest attention from the audience. The English methods were demonstrated in a similar manner by an English joiner. Numerous examples of the artistic products of Japan were shown, and to the South Kensington authorities the audience were indebted for a very valuable collection of Japanese wood-working tools; these tools were used during the evening, as the native craftsman had lost the whole of his native kit in a recent fire. For this reason the native workman deserved some allowance, as the tools of the loan collection were in an indifferent condition, and no time had been available for bringing them into good order. This, however, gave the opportunity of demonstrating what the lecturer also referred to, that the superb workmanship of the Japanese, with its delicacy and admirable accuracy and artistic perception, is produced with tools primitive in their construction and finish. Mr. Cawley confined his remarks principally to the native woods and tools, and with reference to the former called attention to the vast importance of the study of forestry in a country such as Japan, where the

buildings, with few exceptions, have been built of wood. The specimens of native woods that were shown to the audience gave a good idea of the wealth of the Japanese in this respect, and their workmanship was represented by some really beautiful specimens of inlaid work and cabinets. The tools that received most attention were the saw, plane, adze, and boring-tools. The Japanese saw is made with very pronounced teeth, and is used in tension instead of compression, the cutting being done as the tool is drawn back, the English method being the reverse. The Japanese stands on a platform to use the saw, and his foot holds the wood in position. The plane is also different from ours, as the back iron is entirely absent, and the long trying-plane upon which we depend for accurate joints and surfaces is represented in Japan by a piece of thin wood about 18 in. long. The boring tools are also most interesting. The pressure is applied by holding a long wooden handle between the open palms, and thus applying pressure and rotary motion. This is done by English workmen by the centre-bit, which gives greater force, but less skill is required in its application. To sum up the conclusions of the lecture, it may be stated that the crude tools of the Japanese cannot be compared with English tools, and that the Japanese work is somewhat more decorative than constructive, but the skill of the Japanese in their delicate finish and accuracy, and artistic perception, is far beyond that of English workmen. The remarks of a member of the Society at the conclusion of the lecture called attention to the introduction of machinery into Japan and its consequent deteriorating influence on the decorative and artistic qualities of native production. The feudal conditions which existed during long ages no doubt led to much of the artistic work for which Japan is so noted, and there is a distinct analogy between the conditions of the best art work of England and Japan. It is, however, doomed to disappear with the introduction of machinery and the employment of the native workmen to produce articles for the European market.

THE most interesting paper in the new number of the German *Mittheilungen* (1893, 1) is that by Dr. C. Robert on the Sanctuary of Eileithyia at Olympia. It was known from Pausanias that in this sanctuary (P. vi., 20, 2) not only Eileithyia but the mysterious "daimon" Sosipolis, saviour of the city, were worshipped. Who precisely this Sosipolis has remained a puzzle, nor was the site of the sanctuary definitely fixed, though it was known that it lay somewhere between the slope of the hill Kronion and the Treasure houses. Dr. Robert solves both problems. The German excavators, in digging round the Exedra of Herodes Atticus laid bare to the east of the building, *i.e.*, just at the point described by Pausanias between the hill slope and the Treasure houses a very ancient structure. It has hitherto gone by the name of the building behind the Exedra. The *cella* of this building, which is almost square, has its back wall actually leaning against the slope of the hill. The inner part of the wall is carefully worked, but the outside left absolutely in the rough—never intended to be seen. The *pronaos* was of wood on a stone foundation; in the *cella* is the basis of a square altar; the entrance is only large enough for one person. These arrangements just suit the ritual of Sosipolis. He was worshipped with libations and incense. No wine was allowed, which marks the early character of the cult. Honey-cakes were offered to him in his sanctuary. The interesting point is that Dr. Robert makes out by mythological arguments we cannot enumerate here that Sosipolis was no other than the infant Zeus, as worshipped in the cave at Crete. So that we have in the Eileithyia sanctuary practically the earliest shrine of the great Olympian Zeus.

ACCORDING to our contemporary the *Antiquary* the entrance gateway of Westbury College, near Bristol, is threatened with destruction, the site having been sold, and plans for twenty small houses made. Mr. John Taylor, the historian of Bristol, mentions that the church, and a tower in the garden to which a modern house is joined, are the sole remains of the ancient collegiate foundation at Westbury-on-Trym, whereof John Trevisa was a canon, and wherein Wycliff held the prebend of Aust. In or about 824 the monastery was confirmed to Herbert, Bishop of Worcester, as against the Berkeleys. Bishop Oswald established therein, *circa* 980, twelve Benedictine monks he brought from Fleury, in Normandy. Carpenter, elected to the see in 1448, rebuilt and enlarged the college and church, in conjunction with William Canning, who, after his wife's death, took orders and was appointed dean. On the restoration of the church in 1853 they found a crypt below the chancel, and in the south wall of the crypt an arched recess containing a dismantled sepulchre, which was believed to be Carpenter's place of burial. The walls of the recess were painted, in distemper, with a funeral procession passing through a city-gate, and the word "Worcetta" could be deciphered. It is known that Carpenter, who died at Westbury, decided he and his successors should be styled Bishops of Worcester and Westbury. At the Dissolution the manor, which Offa, King of Mercia, had conveyed in a council held at Clovesho to Æthelmund, passed to Sir Ralph Sadler, Governor of Tutbury, when Mary, Queen of Scots, was imprisoned there. In July, 1643, Prince Rupert, marching from Oxford to Bristol, fixed his quarters at the college.

SITTING in the vestry of Greenwich parish church on Saturday last, Mr. Dibdin, Chancellor of the Diocese of Rochester, granted a faculty for the laying out as a garden under the Open Spaces Acts 1877-90 of the churchyard of St. Mary Magdalen's parish church, Woolwich; which was closed by Order in Council, 1853. The church was built in 1726-9 of brick with stone dressings, and with an interior of the Ionic order. Mr. Dibdin did not feel able, though, as reported, he reluctantly refused, to issue a faculty for the erection of a new mortuary within the ground upon the old foundations, whereof a portion remains and are used as a shed and a urinal. He based his judgment upon the terms of the Disused Burial Grounds Act, 1884 (47 and 48 Vict., c. 72), which enacts that it shall not be lawful "to erect any building upon any disused burial-ground," with certain exceptions that do not apply to the case under review; and the terms of the Open Spaces Act, 1887 (50 and 51 Vict., c. 32), which extends that prohibition to "any temporary or movable building." In view of evidence given by Mr. A. C. Reed, clerk to the Woolwich Local Board, he felt bound to regard the proposal as one, in effect, for a re-building; although, in his own private opinion, an exception might well be made for mortuaries as not open to objection on the score of sanitary danger or of desecration. He thought, however, it was a point of considerable importance, inasmuch as local authorities are now bound to provide mortuaries, and that the opinion of the Court of Appeal might well be taken thereon, or steps be taken to secure, by statute, an exemption of the kind he suggested.

THE many professional friends of Mr. T. MacLaren, who went out to Colorado some little time ago on account of his health, will be pleased to hear that he and his drawings have been apparently made much of among the younger architects of Denver (Colorado), and that the Denver Architectural Sketching Club has held a special exhibition of Mr. MacLaren's drawings, with a catalogue

in which reproductions of five of the drawings are given.

At the Fine Art Society's Rooms is a very interesting collection of water-colour drawings made in Japan by Mr. Alfred Parsons, and which give a vivid idea of the colouring of the country. Among specially good ones we may mention "An Iris Pond near Osaka" (13) "A Pink Weed" (31), making the whole flat landscape of a pink colour; "Among the Nikko Cryptomerias—the Red Lacquer Bridge in the Distance" (57)—the red lacquer bridge a most characteristic local incident; "Ripe Rice" (63) giving a fine view of the great Japanese mountain; "The Lotus Ponds of Kakamura Hachiman" (66), a study of a flower which Mr. Parsons declares to be one of the most difficult of all to paint, changing its lines with every breeze and its colour with every cloud; "Fusijian from the Shore near Katase" (94); "Autumn Grass on the Hakone Hills" (98). In the same galleries are the original drawings of Mr. Hugh Thomson's illustrations to the "Ballad of Beau Brocade," admirable examples of line drawing (except some of the horses), and a very curious attempt to realise the probable manner and appearance of middle and lower class Englishmen in that age of heavy feeding and drinking; the types are possibly a little exaggerated, but in the main probably nearer the truth than most illustrators have come.

THE LONDON CONGRESS OF THE ROYAL ARCHÆOLOGICAL INSTITUTE.

It was a wise determination of the Council of the Royal Archaeological Institute to hold the annual congress this year in London rather than in Ireland, as was originally proposed. The Lord Mayor of London has been for many years a member of the society, and we understand that the opportunity of holding the meeting in the metropolis during his year of office had some weight in the decision. The result has probably exceeded the most sanguine expectations of the promoters, for the Congress has been a great success. Not only have the numbers been in excess of what has hitherto been noticed year by year, but the objects brought together for inspection and the official welcome have been all that could be desired.

The members and their friends assembled at the Guildhall on Tuesday morning, the 11th, when they were received by the Lord Mayor, who welcomed them to the City. He was followed by Lord Dillon, the President of the Institute, who briefly sketched out the work before the meeting, and referred to the former Congress held in London in 1866. The Comte de Marsy, President of the Société Française d'Archéologie, who, with some members of that society, are now in England, made some remarks, thanking the English antiquaries for the welcome rendered to them, after which the party adjourned to luncheon at the Manchester Hotel.

In the afternoon a visit was paid to the Church of St. Bartholomew-the-Great, Smithfield, which was found in a very different condition than when it was inspected during the former Congress.

Mr. Aston Webb, the architect who has transformed the church into its present condition from its former state of dilapidation, if not ruin, described the works which he had carried out, his object having been to preserve every portion of the ancient fabric.

The Lady Chapel, which still awaits restoration, was carefully inspected, and much regret was expressed by the members that the work is at a standstill for want of funds, all available means having been for the present exhausted in the purchase of the building, which, as is well known, was until recent years separated from the church and used as a fringe factory. The remains of the recently-discovered crypt were inspected, as well as the condition of the building permitted.

A visit was then paid to the Charterhouse, where the party were received by Canon Elwyn, who welcomed them to inspect the various buildings. Mr. Micklethwaite, F.S.A., gave a short lecture on the arrangements of a Carthusian monastery, illustrating his remarks by a plan of Mount Grace, in Yorkshire, where the system of the inmates, each living in a separate cell or house, was similar to what existed here. The original plan of the buildings can be traced, but the monastic

features have been interfered with to a considerable extent by Sutton's great foundation. The present fabric and its fine hall and roof were inspected, the chaplain pointing out their principal features.

In the evening a *conversazione* was held at the Guildhall, which has already been referred to.

On Wednesday, the 12th, a visit was paid to Lambeth Palace, where in the chapel, restored a few years since, the Archbishop of Canterbury welcomed the party, and rendered an interesting description of the Chapel, which, although of earlier date than the thirteenth century portion of the Temple Church, is singularly like it in the arrangement of the lancet windows. The crypt beneath it was not inspected, at least, by the whole of the party.

On reaching the great hall, the Archbishop briefly referred to its use as the banqueting hall of the Palace, and of its being rebuilt by Archbishop Juxon after the Civil Wars, when the old hall was almost entirely destroyed. The well-known roof is framed on the hammer-beam principle of fifteenth and sixteenth century work. Here Mr. Kershaw, F.S.A., the librarian, had laid out for inspection some of the most remarkable of the MSS. and books of the Lambeth Library, which were examined with much interest, thanks to the capital system with which they were placed before the visitors.

Progress was then made across the Thames to Westminster Abbey. In anticipation of the visit, a lecture had been given on the preceding evening, at the commencement of the work of the Antiquarian Section, during the *conversazione*, when a paper was read by Mr. Micklethwaite on the growth of Westminster Abbey and the monastic buildings. It was illustrated by some diagrams and plans to a large scale, which showed the commencement of the rebuilding of Edward the Confessor's church two hundred years after its erection, and the progress of the work westward, until it came to a stop for many years in the centre of the nave. At length, in the fifteenth century, the work was carried to the west end. The towers were then left to be erected by Sir Christopher Wren. On entering the building, Mr. Micklethwaite led the party around it, repeating the above familiar story of the rebuilding of the church, which his hearers from a distance were well prepared to follow from the diagrams of the previous evening. Two of the most curious remains of the Confessor's church are the bases of the piers on each side of the Presbytery, discovered by Sir Gilbert Scott beneath the tessellated pavement of thirteenth-century work, and although they can be inspected by raising the aperture in the floor, yet it was impossible for them to be inspected by so large a party. The lecturer, therefore, acted wisely by exhibiting on the previous evening a drawing to a large scale, of one of the piers in question. Their existence shows that the former church was narrower than the present one, but that the axis was the same. The thirteenth-century Italian mosaic work in the various pavements and in the shrine of St. Edward the Confessor was inspected, but the tombs of the sovereigns of England and the elaborate work of Henry VII.'s Chapel came in for too short notice.

Luncheon was partaken of in the neighbouring Westminster Palace Hotel, a well-chosen position for much-needed refreshment, since the threatening elements were likely to mar the pleasure of journeying far in the open air, and it was close to the Jerusalem Chamber. In the latter building, later in the afternoon, an unusual spectacle was prepared for the party.

By special leave of the Queen, the robes used at Her Majesty's coronation were on view. In presence of his audience, Dr. Wickham Legg, F.S.A., not only clothed a dummy figure with the robes one by one, but he read a paper of considerable historical importance on the ceremony of the coronation of the Kings of England. By the aid of the figure, the arrangement of the various robes was made clear to the visitors in a graphic manner, the French guests especially taking a lively interest in the proceedings, part of the paper being translated for their benefit by Dr. Vertue, the Bishop of Portsmouth. In the outer apartment were arranged on figures the copes used by the Westminster clergy at Royal coronations, but they are of no great antiquity.

The members and their friends then proceeded to examine the Cloisters, Chapter House, and all the other well-known buildings of the Abbey, many making more than a passing glance at Westminster School and Ashburnham House.

In the evening the party was received at the

Mansion House, as noted elsewhere, the members finding at the close of the meeting a disagreeable change in the weather, and many had to leave in a heavy downpour of rain.

The morning of Thursday, the 13th, was devoted to a visit to St. Paul's Cathedral, where it was arranged for the Rev. L. Gilbertson to conduct the party over the building. After luncheon progress was made to the Tower of London, which was inspected, and the features of its restored condition noted, the Armoury attracting a lengthy examination, while the regalia came in for proper attention. All the objects were described by various members of the party. In the evening, the rooms of the Royal Society were placed at the service of the members, and here they assembled in lessened numbers after a fatiguing day's proceedings to hear a paper of interest on the "Origin of Mayoralities," by Mr. J. H. Round, read as an opening of the Historical Section. A paper was also prepared by the Rev. Dr. Cox, on the "Visit to London of Sir Miles Stapleton, of Carlton Hall, Yorkshire, in the latter part of the seventeenth century."

Friday, the 14th, was set apart for a visit to Hampton Court. Fortunately no rain fell, but the day appeared gloomy after the brilliant sunshine of recent times. However, the party were prepared to inspect all that was brought before them; and under the guidance of Mr. Ernest Law, whose recent work on the Palace is so well known, and others, they were conducted over the interesting pile of buildings; the pictures, the tapestries, and the earliest part of the Palace being examined with interest. On the return to London, later in the day, a meeting was held in the rooms of the Society of Antiquaries, Burlington House, kindly placed at the disposal of the Institute by that Society. A paper on Ironwork in London was announced for reading, prepared by Mr. Longden. The second paper was one of more than unusual interest to the student of Comparative Archaeology. It was in French: "Sur les Vallées de la Dombrouja," by M. Toldeco, Director of the National Museum of Antiquities at Bucharest. The paper is perhaps the most complete that has yet been laid before any Antiquarian Society in the west of Europe, and it entered into ample details of the remarkable line of defences and demarcation of Roman date. It was illustrated by a great many ground plans to a small scale, too small for inspection from a distance. A drawing, showing a restoration of the earthworks and wall where the latter was of masonry, indicated the stone wall strengthened on the inner side and also on the outer one by a ditch and bank, that on the interior having a passage-way between it and the wall raised with the excavated earth, so that the defenders were elevated to an easy height in relation to the wall, the stone wall being the parapet of defence. Some small battlements were shown on the restoration, so small as to suggest weakness rather than strength, since they would have afforded an easy means of support to the grappling apparatus of any scaling party from the exterior. The restoration is hardly likely to be exact in this respect. There were many supporting stations, plans of which were exhibited, showing the results of recent researches. They are rectangular in form and of varying size. The details of this important barrier are of considerable interest to English and Scotch antiquaries, since they can be compared with the construction of the Antonine Wall in Scotland and the Great Wall from the Tyne to Bowness in the North of England, to which works there is great similarity, indicating that there was a central directing power in relation to these works, and also with respect to the great German *Wälle*.

Early on Saturday morning, the 15th, the rooms of the Society of Antiquaries were again at the disposal of the Congress, and were speedily filled by the members, who assembled to hear a description of the excavations at the Roman City at Silchester, by Mr. G. E. Fox, F.S.A., who has done so much to disinter the remains from the accumulated earth of centuries. Aided by a series of admirable diagrams, the work of discovery was reported, the most recent finds being described in detail. Afterwards, the annual meeting of the Institute was held, to which members only were invited to attend. Later in the afternoon a visit to Eton College was arranged for, under the direction of Mr. J. W. Clark, F.S.A.

Monday, the 17th, was set apart for an inspection of a group of the churches of the City of London, those built from the designs of Sir Christopher Wren being purposely selected. The sun shone out brilliantly, after the accustomed manner, different from its absence or almost entire absence, during the earlier days of the Congress. The party presented an unusual appearance as

* See page 43, ante.

they took their course through either out-of-the-way streets of the Metropolis, or as they crossed some of the busy thoroughfares which separated them from the objects of their quest. The churches selected for examination were as follows: St. Mary, Aldermary—where, however, there is much ancient work, including the fine tower, which was a new building when the great Fire of 1666, destroyed the church to which it was attached, and the restoration of a few years since, revealed the fact that much of the walling also is ancient, including almost the whole of the vestry; Wren's plaster imitation groinings give a good idea of his Gothic work—poor in detail, but good in general effect; St. Stephen's Walbrook, where Wren's genius has produced an interior so well known as one of his best works; St. Margaret's, Lothbury, where the exterior does not afford much subject for commendation. St. Peter, upon Cornhill, where there is a plain exterior and a simple brick tower with a leaded spire, and an interior much more worthy of inspection; one of the two chancel screens existing in the City being here, although the open character of the design, and the absence of doors of separation, and emblems, renders it a very different composition than the screens of many modern churches. Indeed, the absence of crosses and other modern features of design are conspicuous in all Sir Christopher Wren's churches, although no visitor can enter one of these buildings without being at once impressed with the knowledge that he is within a building set apart for Divine Worship. St. Mary Abchurch, with its poor brick exterior; and as a pendant to Wren's work, the impressive Church of St. Mary Woolnoth, erected by Hawksmoor. The selection is hardly the best that could have been made, and it is curious that St. Michael Paternoster, or St. James, Garlick Hythe, or St. Mildred's, Bread-street, all close at hand, should have been omitted in preference for the others. But still, the arrangement to inspect any of the churches of later date than the Great Fire, rather than the Gothic churches which escaped it, which are so constantly selected by antiquarian societies for visiting, was a new idea, and the visitors may in consequence be assisted to recognise that the genius of an architect rather than the choice of style is the more important element for the design of a fitting fabric for a church.

Later in the afternoon the party was to proceed to the Guildhall, to the Historical Section, to hear a paper by Mr. G. Scharf, C.B., F.S.A., on the "Portraits of the Judges in the Guildhall." It will be remembered that Mr. Scharf contributed an important paper on the Royal pictures which were once at Whitehall and in other palaces, at the Congress held by the Institute in London twenty-seven years ago.

The order of visit to the various churches is given as set forth in the programme, but this was slightly varied in order to pay a visit to the ancient Church of St. Helen, Bishopsgate, but which could not be effected.

In the evening the members and their friends assembled in the Hall of the Merchant Taylors' Company, Threadneedle-street, at a reception given by the London and Middlesex Archaeological Society. Here a fine collection of plate belonging to the various City companies had been arranged for inspection, including beades' staves and a fair amount of church plate. Among the company were many members of the City Corporation and the various companies, the Lord Mayor, &c.

The Temple Church was visited on Tuesday, the 18th, when the round portion, the gallery containing the gathering of tombs removed from the building when it was restored, the cell on the staircase of approach to the gallery, and the Bishop's Effigy on the south side of the nave, were examined under the guidance of Mr. T. H. Baylis, Q.C. The fine effigies in the round church were also inspected. Progress was then made to the hall of the Middle Temple, where the fine screen and open timber roof, not unlike in principle the later one in the hall of Lambeth Palace, were pointed out to the visitors.

In the afternoon a meeting was again held in the rooms of the Society of Antiquaries, Burlington House, when Mr. St. John Hope, M.A., read a paper on the "Architectural History of Windsor Castle," in anticipation of the visit on the 19th.

An hour each was then devoted to visits to St. James's Palace, where the chapel, with its elegant but simple flat roof, and the old gateway of brick, were examined, and Buckingham Palace, where the paintings were inspected.

The concluding meeting was held at the Mansion House in the evening, when an

interesting congress, well attended, was brought to a close. Two extra days are being provided for, however, so that the visit of the members to London may include as many objects of antiquarian interest as possible.

On the 19th a visit to Windsor Castle was arranged for, when the earliest portion of the fabric was to be pointed out by Mr. St. John Hope; the library and the State apartments, with the chief of the paintings, were to be described by Mr. R. K. Holmes, F.S.A., Librarian to Her Majesty. Later in the day St. George's Chapel, the curious timber cloisters, and the other special features of the Castle were to be examined.

We understand that Thursday, the 20th, was reserved for a visit to Silchester, where the Roman walls and the excavations now in progress will be examined.

INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS: ANNUAL MEETING.

THE annual meeting of the members of this Association was opened in the Town Hall, West Bromwich, on Thursday, July 13. The President (Mr. J. Cartwright, of Bury), presided, and there were present Mr. J. T. Eayrs (West Bromwich, President-Elect), Messrs. T. De Courcy Meade (Hornsey), C. Jones (Ealing), Major Isaacs (Holborn), W. H. Savage (East Ham), S. S. Gamble (London), R. Hammond (London), Spencer Hart (Dublin), H. Percy Boulnois (Liverpool), F. Ashmead (Bristol), R. Godfrey (King's Norton), A. T. Davis (Shrewsbury, Honorary Secretary for the Midlands), E. R. S. Scott (Ilkhalif), J. H. Cox (Bradford), S. S. Platt (Rochdale), J. Lohley (Hartley), J. Gregory (Padiham), J. A. Crowther (Bootle), E. J. Silcock (King's Lynn), E. M. Scott (Widnesbury), H. Richardson (Oldbury), C. F. Marston (Sutton Coldfield), J. Clare (Sleaford), H. W. Taylor (Newmarket), A. G. Collins (Reading), A. H. Campbell (Stratford-on-Avon), C. C. Smith (Dalton-in-Furness), J. S. Pickering (Nuneaton), W. H. Jukes (Tipton), C. W. Shackleton (Coseley), W. H. Smith (Carlisle), R. H. Middleton (Walsall), W. C. Eddowes (Shrewsbury), S. Edmundson (Burnley), H. Dearden (Batley), J. W. Wardle (Longton), T. W. Stainthorpe (Eston, Middlesbrough), F. Massie (Wakefield), T. L. Lewis (St. George's, Bristol), H. Goodyear (Colchester), G. S. Horton (Felixstowe), J. Gammage (Dudley), J. Robinson (Winchester), E. P. Hooley (Nottingham), C. C. Hooley (Barton-upon-Irwell), J. N. Brown (West Hartlepool), S. Stead (Harrogate), W. H. Hopkinson (Keighley), J. Wilson (Bacup), J. Morgan (Pontardawe, Swansea), W. G. Lawson (Southgate), E. Willcox (Birmingham), C. Kirby (Newport), F. Cartwright (Bury), H. J. Clarson (Tamworth), H. Waye (Milton), T. W. Franks (West Bromwich), and T. Cole, Secretary.

Prior to the annual meeting a special general meeting of members was held to consider a proposed alteration of the articles of association. Mr. R. Godfrey (King's Norton) moved that the articles of association be amended by inserting in article 25 the words "fifteen ordinary members" in lieu of "twelve ordinary members." Having referred to the large *ex-officio* representation of past-Presidents on the Council of the Association, he expressed an opinion that the elected representatives should be increased.

Mr. J. T. Eayrs (West Bromwich) seconded the proposition, which after prolonged discussion was adopted almost unanimously.

The business of the special meeting having been transacted the Deputy Mayor (Councillor G. Salter) attended, and in the name of the Mayor and Corporation offered the Association a hearty welcome to West Bromwich. They looked upon the visit of the Association as a great honour to the town, and they thought additional honour had been conferred by the choice of their Borough Engineer, Mr. Eayrs, as President for the ensuing year.

The President acknowledged the welcome which they had received from the Corporation.

Mr. T. Cole (Secretary) then read the twentieth annual report of the Council, which expressed satisfaction at the continued success of the Association and of the meetings held. During the year ending April 30 fifty new members, consisting of thirty-seven ordinary members and thirteen graduates, had joined the Association. At the close of the year there were on the roll of the Association eleven honorary members, 485 ordinary members, and forty-seven graduates, making a total of 543, or an addition of forty to the membership compared with the previous year.

The balance of cash in hand was 110*l.* 1*s.* 1*d.*, in addition to 300*l.* invested in Southampton Corporation stock. Mr. J. T. Eayrs, West Bromwich, had been elected President, and Messrs. A. R. Binnie, London; J. Cooper, Edinburgh; and S. Hart, Dublin; Vice-Presidents. The premiums for the best papers read had been awarded, the first, of 10*l.*, to Mr. J. H. Cox, of Bradford, for his paper on "Street Tramways and Electrical Traction," read at the Bury meeting; and the second of 5*l.* to Mr. Spencer Hart, of Dublin, for his paper (read at the Dublin meeting) on "Sanitary and other works carried out by the Corporation of Dublin."

The President, in moving the adoption of the report, expressed his satisfaction that in members, finances, and examination, the Association continued to maintain and improve its position.

Mr. J. T. Eayrs seconded the proposition, which was adopted.

Mr. Massie (Wakefield), thought it would be an advantage if members were supplied with a printed copy of the annual report.

Mr. T. de Courcy Meade explained that the report, in order to be a complete record of the year's proceedings, was brought up to the morning of the annual meeting, so that the proposal was impracticable.

A question was raised as to the attendances of members of the Council, and on the proposition of Mr. Massie (Wakefield) it was resolved that in future printed lists of attendances should be supplied with the ballot papers.

The President then presented the premiums, in the form of books selected by the receivers, for the best papers read to the Association—the first to Mr. Cox, of Bradford, and the second to Mr. S. Hart, of Dublin.

The President then introduced to the meeting his successor, and, in handing over the Presidential chair, congratulated Mr. Eayrs, upon his appointment to the position.

Mr. Eayrs having been warmly welcomed into the Presidential chair, proceeded to propose a vote of thanks to the retiring President (Mr. Cartwright) for his able services during the past year. He was certain that no one who had preceded Mr. Cartwright had filled the office with greater honour and credit to the Association. His energies had always been at the service of the Association, and the lustre which had always attached to the chair had lost none of its brightness during Mr. Cartwright's term of office.

Mr. Ashmead (Bristol) seconded the vote of thanks, which was accorded with enthusiastic unanimity.

Mr. Cartwright, in acknowledgment, assured the members that it had been a pleasurable duty to him to act as President of the Association during the past year.

The President's Address.

The newly-elected President, Mr. J. T. Eayrs, F.S.I., Assoc. Mem. Inst. C.E., then delivered his Presidential address, in the course of which he said:—In my search for a suitable theme upon which to found my remarks, it has seemed to me upon consideration that it may be possible to occupy some of your time to-day not unprofitably in briefly reviewing those modifications which from one cause or another are gradually taking place in our position both as individuals and as an association.

We, in common with other kindred officers engaged in public or semi-public service, have need to be constantly watchful of our own interest, constantly alive to the imposition of new duties upon us, and fully capable of directing and advising those who employ us in every phase and every modern aspect of thought and legislation which may affect ourselves and our profession.

It is scarcely necessary to point out to you the fact that the position which we hold as individuals and as a society is rapidly increasing both in honour and in responsibility, and that in the advances which are made from time to time in sanitary science and local government our place becomes more and more defined as one of trust and importance; still, I wish to impress upon you the necessity of the most careful study and watchfulness on the part of the individual as well as of the association for the protection of our interests.

At the present moment we are met by two great tendencies which are modifying and affecting our position and our duties: the great social causes of which these tendencies form the visible expression comprise subjects far beyond the scope of an address like mine, however interesting it may be to the student of social science; at the same time this much may be said with

certainly, that they represent a movement the final end and direction of which few of us would dare to indicate. This is no question of party politics, but rather of natural growth and evolution, and all political parties are affected by it equally.

The first of these tendencies to which I allude is that to decentralise. We are now met at every end and corner by a demand for local self-government: one might almost say for "Home Rule." This demand is one which Governments cannot afford to disregard, and which has received abundant recognition already, while even greater concessions are projected for future legislation. Results are but now for the first time becoming manifest to us, and present a problem well worthy of serious analysis. I am not sure that they will be found to be entirely good. It is, in my opinion, not an unmixed blessing to hand over to a purely elective body the complete control of their own affairs. Small boards and small councils necessarily composed of men whose business avocations are numerous and engrossing, and whose leisure for the study of social or sanitary problems is even more limited than their desire for knowledge, are scarcely bodies calculated to do great works. It would be easy, doubtless, to point to the splendid achievements of the great cities and municipalities of this country where gigantic projects are magnificently carried out—to quote the energy of Liverpool, the pluck of Manchester, or, to come nearer home, the determination of Birmingham in public works necessary for the prosperity and well-being of their citizens and the adornment of their streets, but the great majority must of necessity be far otherwise.

A study of small municipalities and local boards is far from being uninteresting. Those of you who have read that clever but sarcastic book, "The Natural History of Local Boards,"* have doubtless been familiar with many of the characteristics which the author so well knew how to delineate; the inherent weakness of local bodies was never so well illustrated. Personal prejudices, party politics, and petty financial considerations all play a part in the decision of questions far too great and too broad to be thus obscured. The desire for real improvement thus becomes frittered away, and valuable opportunities are lost. To all of us such disappointments are only too familiar, and no profit can ensue from further dwelling upon them.

In this decentralising movement the most important tangible result has been the Local Government Act of 1888, and the consequent creation of county authorities and new duties. We are all aware that the system thus formed is still incomplete, and I do not propose here to discuss those details which are necessary to its completion. Sufficient time has, however, elapsed since the Act came into force to permit a passing glance at the character of the authorities created, the new duties imposed upon them, and the spirit in which they have been entered upon.

County authorities—and in this term I do not include county boroughs—are much like other local boards, save that they possess a greater number of members of leisure and position; men will be found upon them whose views and opinions are liable to be swayed by the considerations I have already mentioned, and although a great many have entered upon their work with energy and vigour, and have done good already, others have largely failed to grasp the broad duties which devolved upon them in their creation. I make no mention of county boroughs, because the municipal side of their functions has completely swamped the county portion.

Two duties of the County Council seem to call for more than a passing word from me: (1) the power to enforce the provisions of the Rivers Pollution Prevention Act (sec. 14), and (2) the maintenance of main roads (sec. 11). Both these sections have already given rise to questions of interest and of some difficulty.

The pollution of rivers has been taken up by the sanitary committees of Staffordshire, Warwickshire, Lancashire, and Yorkshire, and in some cases not only is the pollution from common sewage and manufacturers' refuse in undraind districts inspected and reported on, but special inspection of sewage works belonging to local authorities has been instituted. No one will, of course, question the rights of the county councils with respect to rivers pollution prevention, but the claim to enter upon and inspect the sewage works of all subordinate authorities without notice is a somewhat arbitrary one, and is calculated to create no little friction, and if this be the case

with subordinate authorities, still more will such a claim be resented by the county boroughs. Doubtless we are all anxious to keep our sewage out of the rivers and canals which surround and intersect our districts, but nobody is more alive to the difficulties and hindrances which we as sanitary engineers constantly meet with. The institution and maintenance of proper and efficient works of drainage, the comparative merits of the various systems of sewage treatment, are among the most trying and anxious problems of our professional work, and I cannot help feeling that any rash or precipitate attempt to enforce arbitrary regulations by county committees will not be a movement calculated to do permanent good work.

With regard to the maintenance of main roads, the position of affairs has advanced even further, and in many instances the relations between the County Council and its highway authorities have been subjected to considerable strain. The subject of main roads and their maintenance has already become a question for arbitration by the Local Government Board. To what extent shall the county contribute? The main difficulties are the maintenance of footpaths (notwithstanding the Warmister decision), the cost of scavenging, watering, and improvements, and the dispute arises over the word "towards." Let me remind you that previous to the Act of 1888 three-fourths of the cost of maintenance of main roads was borne by the county, and the remaining one-fourth was provided by imperial revenue. It cannot be supposed that the intention of the Legislature, in a measure for extending the powers and privileges of local authorities, was to limit the scope of highway boards and to place them in a worse financial position than before.

I submit that the intention of Clause 11 was to include in the words "maintenance, repair, improvement, and enlargement," such things as widening, straightening, forming new footpaths, improving gradients, &c., and members will find that this contention has been in some cases upheld. In any case, the question is one which is deserving of the most serious and careful consideration, and a study of the various arbitrations and decisions of the Local Government Board will well repay the time spent upon it.

This particular point does not affect county boroughs like West Bromwich, but there remains a question relating to main roads in which they are concerned, and which it is convenient to mention here. I allude to the power of creating additional main roads. There seems to be no reason why the council of a county borough should not if they think fit declare additional main roads, and as the cost of these roads is provided out of the borough fund, a fund collected on the poor-rate assessment, it alters the incidence of taxation for the repair of these roads. This is the more important as land, railways and canals pay this rate on the full assessment, but are rated to the district rate only on one-fourth. To put it briefly, by such a change the district rate is relieved at the expense of the borough fund, and as the amount realised from the borough fund is greater, there is a positive advantage to those rated at the full amount.

But apart from such technical difficulties as those to which I have alluded, I feel that we shall all recognise the good work done under the Local Government Act, and at the same time admit that in time, "which tries all things," more may be accomplished. Much will depend upon how the work is approached by the county authorities and their officials, and it may be a useful advice to remember that "more flies are caught by treacle than by mustard."

In spite, however, of the decentralising tendency which marks such legislation as this, let us be grateful that our great central authority remains intact; undiminished in power, and adorned by a staff whose knowledge and experience justly entitle them to be arbitrators and rulers in local government. Perhaps there may have been moments when delays have seemed vexatious and unnecessary, when restrictions have appeared arbitrary, or when decisions have unexpectedly gone the wrong way. Such experiences occur to all of us; at the same time I feel confident that you will agree with me in the main that we have much to be proud of and much to appreciate in the local and reasonable spirit which guides their decisions. Not the least important of the duties which fall to our lot is to appear before an inspector and represent the needs and requirements of the place under our charge, and in so doing it is no small consolation to feel that we are in the presence of an expert, who not only listens patiently to the evidence placed before him by the local authority, but also to the

grievances and opposition of dissatisfied ratepayers, and whose report will not be influenced either by local bias or narrow prejudices.

Our new decentralised system still lacks completion, and there does not appear much prospect of the District Councils Bill becoming law for some time. I do not, however, propose to discuss that measure, as it will receive attention at your hands in a paper to be read at this meeting. I propose instead to say a few words upon another modern tendency—the development of municipal control. I do not so much mean the growing desire of towns for the honour of incorporation, nor do I allude to the rapidity with which the modern municipality starts into vigorous life, but rather do I refer to the tendency of the town council to municipalise everything and to arrogate to themselves the control of every department and every operation which can by any conceivable pretext be termed "municipal."

In the modern borough up to date we are to have the water supply, gasworks, electric lighting, tramways, electric and hydraulic power, common lodging-houses, artisans' dwellings, schools for art, science, and manual training, with all kinds of technical education, and even fire insurance; nor does it end here; the London County Council is setting the example, and the larger provincial centres may probably follow, in the establishment of factories and workshops at the expense of the rates for the carrying out of municipal works without the intervention of a contractor, and it is now proposed that corporations should undertake the prevention of sweating.

It is no part of my intention to discuss in this address the political or social bearing of this new phase of trade competition, but it is merely a foreshadowing of a new doctrine which may affect our duties to a large extent. The relation of the municipality to the working man and to the employment of labour generally has assumed new features of late years. The claim of the working man to a "fair day's wages" for a "fair day's work," a claim stamped by Carlyle as the "everlasting right of man," must now be dealt with by municipal authorities. It may be that some of you will say that this question does not really concern us in our official position. I think you may find yourselves called upon to undertake anxiety and responsibility in connexion with this problem. But this tendency to municipalise every public work is bound to involve us in greater labour and greater responsibility. New duties and new requirements are soon thrust upon us, whether we will or no. It is not enough that we are to carry out our ordinary duties of engineers and surveyors in making and maintaining roads and sewers and devising schemes of street improvements, but we are called upon to be architects, decorators, mechanical engineers, electricians, landscape gardeners, and, I may almost add, financiers, and, in addition, we find ourselves constituted into a labour bureau. We may be called upon not only to see that contractors pay the standard rate of wages to their employees for whatever work is done for the municipality, but at any moment to devise some work for the unemployed. We are liable to be called to account for every man who presents himself to work, however worthless or idle he may turn out to be, and countless annoyances follow. Add to this that financially the scheme is usually a failure. It is true that in the recent circular affecting local authorities and guardians and the employment of the unemployed, a suggestion was made as to the rate of wages to be paid, but this affects the whole question of contracts and trade competition. At the same time that public bodies are being urged to provide their own workshops and compete in contracts with their former contractors, members keep bringing forward resolutions not to employ any firm who does not pay trades union wages, which are settled by the men themselves and liable to alteration at any moment. Surely this is confusion worse confounded. We, as officials, are expected to estimate with something like accuracy our requirements for the year's work, and also the cost of schemes extended in some cases over several years, and elements such as I have named cannot fail entirely to upset our calculations.

Let me for a moment quote my own recent experience. We opened a stoneyard for the unemployed in January, and kept it in operation just three months—83 working days, with the following result: Out of a total of 121 men, 30 worked one day and 11 two days—i.e., more than one-third worked two days and under, another one-third worked nine days and under, leaving 40 men who averaged 38½ days apiece. But the

* This book was reviewed in the *Builder* for December 1888, at 40m length.

worst feature of this was the cost. These men broke 672 tons of Rowley ragstone at a cost of 295*l.* 7*s.* 1*d.*, including superintendence, and the same stone could have been purchased ready broken at contract price for 193*l.* 4*s.*, showing a loss to the Corporation of 102*l.* odd.

I could pursue this question of labour under municipal auspices, but I feel that all of you must have known something of it. Do not imagine that I consider it any part of my function to discourage healthy and vigorous municipal growth; at the same time, it is certainly open to argument whether or not the tendency is to go too far.

No review of our present position would, however, be complete without some reference to recent progress in sanitary legislation. Since the passing of the Act of 1875, public health has advanced by leaps and bounds, until it has attained a pre-eminence which requires careful enquiry and careful study. Never probably in the history of any nation was there a time when those to whom is entrusted the care of public health and the administration of sanitary legislation have occupied a position of greater difficulty and greater responsibility.

The activity which has distinguished our sanitary scientists has been reflected in the pages of our Statute Book, and a number of minor Public Health Acts have been passed for the purpose of modifying the principal Act, or dealing with matters which were not included therein. I do not propose to weary you with an epitome of these statutes, some of which are of the briefest character, but merely to comment upon one or two salient points affecting our profession.

Passing over minor statutes, I would remark that it is a misfortune that there is a growing tendency to make sanitary laws adoptive. The two Acts relating to infectious disease and the Public Health Acts Amendment Act (a most unwieldy title) come under this condemnation, and thus contribute to the opportunities already afforded to smaller authorities to injure not only themselves but their neighbours. The fact that clauses in private Acts already complicate the uniform practice of sanitary engineering is sufficiently puzzling to the compiler of statistics without the further complications of adoptive law.

Let us, however, suppose the Act of 1890 to have been adopted, and occupy a few moments over some of its paradoxes. Everybody, of course, knows that according to the Act of 1875, section 4, "a drain" is a drain which belongs to one building only, or to buildings within the same curtilage, &c., while "a sewer" includes all sewers and drains except those so defined; and, further, by section 13, every sewer is vested in the local authority. These facts, though at times unpalatable, are fairly clear; but in consequence of certain decided cases, the draughtsman of the Act of 1890 framed a clause (19) in which for the first time we hear of "private drains," which serve for the drainage of more than one house belonging to different owners. Further than this, within the limits of the metropolis (Metropolitan Local Management Act, 1855, sec. 74) a group of houses may be drained by a "combined operation," which combined operation has been decided on appeal to be a *drain* and not a *sewer*. It thus happens that owing to the division or sale of properties, the erection of boundary walls, and other matters over which neither the sanitary authority nor its officers have any control, *drains* may become *sewers*, but no means appear to exist by which the sanitary authority may divest itself of a sewer and restore it to its position of drain. One crumb of comfort remains, and that is that the sanitary authority may not be held liable for any nuisance arising in such a drain unless it can be shown that they had reasonable means of knowing that the drain had become a sewer, or if the conversion of the drain into a sewer had come about by an illegal connection and without their consent.

It was in view of difficulties akin to these arising in my own experience that I addressed a series of queries to a number of selected towns; and my apology for speaking at such length upon so technical a detail consists in the replies I received. Out of sixty-four authorities, no less than thirty are in the habit of permitting what they call "common drains"—i.e., sewers—to be laid by private owners, and eleven went so far as to say that they did not consider such drains to be sewers. I can only refer anyone who is inclined to agree with these eleven to a recent decision which confirms what I have stated above ("Pincock v. Watersworth"). In a similar case differing only in detail of yard separation—i.e., houses with separate yards and a common entry, no less than forty-two permitted such drains—i.e., sewers,

to be laid. Special exception must be made of Reading, which has a private Act similar to the Metropolitan Act above quoted; of Hendon, who make a special agreement for contracting themselves out of the Act; and of Sheffield, who exact a form of indemnity; but how far such special agreement or form will override the statute law is at least open to grave doubts. In one case experience came to the rescue—I allude to Middlesbrough, where such drains have been forced upon the Sanitary Authority as sewers.

It will be seen from these few details that the question is fraught with grave difficulties, and if disregarded, may land an authority into very serious expenditure and litigation, besides discrediting the engineer whose advice has guided the authority in their action.

The improvements effected in this Act are too varied and too numerous to mention in detail; the clauses relating to private streets, backroads, public sanitary conveniences, the cleansing of courts, the provision of hoardings, and the safety of structures, all form valuable additions to the powers we exercise, and notwithstanding they entail additional work and responsibility, it is the duty of everyone of us to urge upon our employers the advisability of adopting these portions of the Act if they have not already done so.

No mention of this Act would be complete, however, without some allusion to the alteration made by it in the construction of streets. To comment upon it at length is unnecessary, as we are all aware of the excellent work done by our colleague, Mr. Spinks, in collecting all the information on the subject. One word only is required. Since the judgments therein quoted as to the definition of a street, the Public Health Act, London, has gone further, and in Sec. 141, has added to the previous definition these words, "whether or not there are houses in such street."

A new adoptive Act relating to private streets became law last year, but I am given to understand that it is not an unmixt blessing. We shall, however, hear more about it in a paper to be read at this meeting.

Another Act which requires consideration on the part of municipal surveyors is the recent Factories and Workshops Act, 1891, in which the duties of both the Surveyor and Medical Officer are increased, but as the provisions of this Act were so ably dealt with at our last annual meeting by our colleague, Mr. Boulnois, I will not pursue this portion of my subject further, lest I should weary you by its dryness and technicality. I feel that even if the questions herein touched upon were not familiar to you, I have made it fully apparent that the law of public health needs consolidation. The most recent of Public Health Acts (London, 1891), has attempted to do this work for London. In this enactment, which contains 144 sections, over 40 contain wholly new matter, while many others have been amended and improved. The extent to which the ground has been cleared and good work done by this consolidation may be best understood by a glance at the Fourth Schedule, which details the Acts repealed.

Perhaps in the remote future, when the course of legislation runs more smoothly, there may be a hope that the Public Health Acts for England and Wales will be consolidated, and that we shall be spared the necessity of referring to repealed clauses and of struggling through the pages of Lumley, Glen, Fitzgerald, and Macmorran, beside which the typically unintelligible "Bradshaw" becomes a mere A B C book.

Before I conclude my remarks I cannot but congratulate our Association upon doing such good work for our profession, and also upon the great accession to our numbers. I am also pleased to see the great interest which is taken in our annual and district meetings, and the generous recognition we receive at the hands of the local authorities and others. These annual and district meetings not only bring members together in order that they may know each other personally, whereby friendships are formed which would otherwise be almost impossible, but the reading and discussion of papers of professional interest, and the interchange of ideas on various points of difficulty and practice in municipal work, and the comparing of notes, all tend to the direct benefit of the various local authorities, and no one but ourselves can estimate the advantages gained by personal association. It is gratifying to know that a large number of local authorities think it worth their while to pay the expenses of their surveyors to our meetings, and I am sure they get good value for the money thus expended.

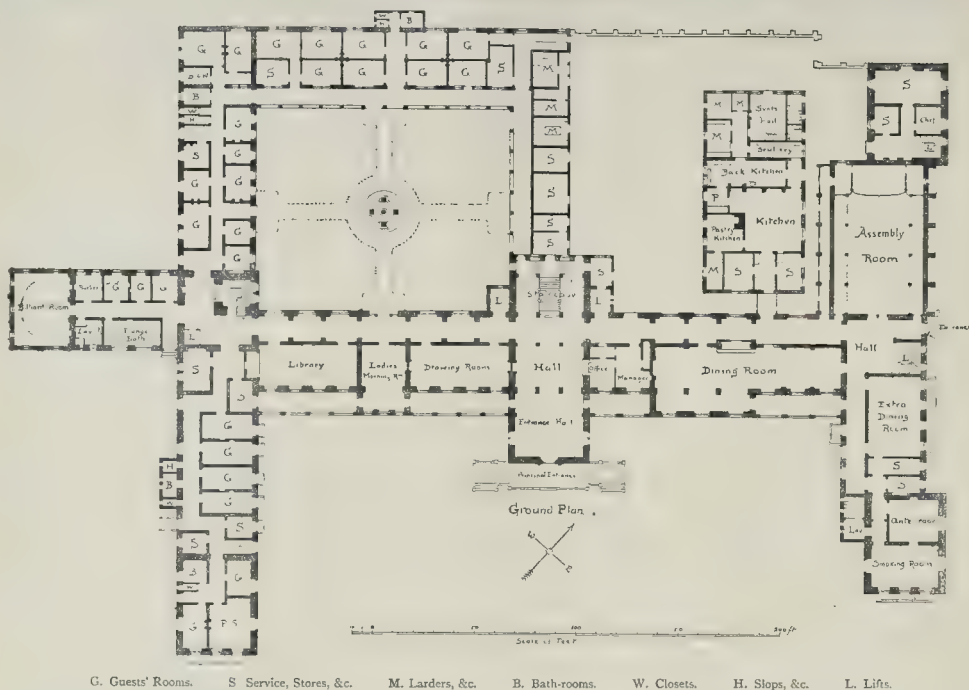
I spoke at the commencement of my address of modern tendencies, and in this connexion I am reminded of another. I mean the tendency to

raise the standard of everything. The evolution of the modern municipal engineer is a subject which may at any time fully engage the attention of those in authority. Models of the old style of surveyor, now becoming a *rara avis*, are well known to some of you—men who having been farmers were supposed to be land surveyors; masons who were supposed to understand drains; drapers who, being accustomed to a yard stick, could measure anything; and even men of such varied talents as to be able to combine in one person the offices of clerk, engineer and surveyor, nuisance inspector and collector, and who all unfortunately agreed in their capacity to accept salaries which were a disgrace to the authority who employed them. What wonder, then, that the profession, while it contained many talented men among its ranks whose works live after them as monuments of skill, undeniably became the refuge of broken men of every class and calling?

The value of our examinations and certificate is a subject which should concern everyone of us, and it has come before us forcibly during the past year, owing to the attempt of the Sanitary Institute to obtain a Royal Charter. Far be it from me to deny that the Sanitary Institute has done good work in keeping the advantages of sanitation before the general public, or to depreciate the value of a certificate which has become a hall-mark for sanitary inspectors. It is for us to see that the examination which we hold and the certificate which we issue is a true guarantee of the proficiency of those who possess it. There will then be little difficulty in persuading our local authorities, when advertising for an Engineer and Surveyor, to require that all applicants should either be members of our Association or have obtained our certificate. To us, and in my opinion to us alone, should belong the door by which entrance is gained to the ranks of our profession, a door to which efficient knowledge is the only key. The Association which we have created has become one of world-wide influence and power. Only within the last few weeks I have seen an announcement that a local authority of a seaside resort, under a system of sanitary registration are prepared to officially accept a certificate of any member of our Association as to the sanitary condition of premises within its area. The development of Indian and colonial municipalities has an especial interest for us, whose members are scattered over the face of the globe, and who are called upon to design and direct great works of municipal engineering and sanitation in the cities of the east as well as those of the western world.

Finally, gentlemen, in thanking you for the attention with which you have listened to these random thoughts, may I be permitted for a moment to dwell upon the more ideal aspect of our profession? The tendencies to which I have alluded in my address are gradually moulding our municipal life, day-by-day new discoveries are made, new forces are brought into action, and who is to say what the ultimate product may be? There has been no more favourite theme for speculation than the results of social evolution; More's "Utopia" and Bacon's "Atlantis" among English classics, and later Dr. Richardson's "Hygieopolis" and Bellamy's "Looking Backward," all afford examples of this form of phantasy. Nor is it altogether an idle pursuit: the doctrine of evolution applies even to Local Government, and I venture to believe that even in its most idealised form we shall occupy an honourable place. In that ideal municipality we may hope that at least one disturbing factor will have disappeared—I mean the strife engendered by party politics. We, as officials, have no politics, but it is no uncommon thing to see our pet schemes for improvements lost in the whirlpool of contending factions. In that municipality of the future, whether our streets are paved with wood, indiarubber, or toughened glass, whether our tramways are aerial or subterranean, even though the great sewage problem be solved at last, I venture to think the municipal engineer will receive even more credit and honour than he does now.

Mr. H. P. Boulnois (Liverpool) said he was sure he was echoing the feelings of members generally in proposing a hearty vote of thanks to the President for his excellent address. They might call it a model Presidential address, full of literary merit, sound common sense, and practical information. It contained, of course, as most Presidential addresses did, reference to some disputable questions, but it was not their rule to discuss the Presidential address, and, therefore, he would content himself in moving "That the best thanks of this meeting be given to Mr. Eayrs for his Presidential address."



Plan of Proposed Hotel, Funchal, Madeira.

Mr. J. Lobley (Hanley) seconded the vote of thanks, which having been accorded, was acknowledged by the President in terms of suitable brevity.

The meeting then adjourned, the members being entertained at luncheon by the Mayor of West Bromwich (Councillor Akrill) at the Masonic Hall. The toast of the Queen having been loyally honoured, the Mayor proposed the "Incorporated Association of Municipal and County Engineers." Having congratulated the Association upon the choice of Mr. Eayrs as President, an office he believed he would fill to the satisfaction of the Association, he said he was pleased at the inception of the idea which brought that Association into existence. Not only were they fulfilling their responsibilities and duties, but they met together year by year to bring all their intelligence to bear upon the subjects arising for discussion, with the result that the towns they represented received the benefit of the experience gained at their meetings.

The toast having been honoured,

The President, in acknowledgement, thanked the Mayor and Corporation for their hospitality to them, and said that wherever municipal engineers went they were always received with the greatest cordiality and kindness.

Mr. H. P. Boulnois proposed the toast of the Mayor and Corporation of West Bromwich.

The Mayor returned thanks, and echoed the hope expressed by Mr. Boulnois, that towns would see their way to pay the expenses of their officers to the meetings of the Association.

After luncheon the members reassembled in the Town Hall, and the business of the annual meeting was resumed.

Mr. R. Godfrey (King's Norton) formally moved the re-election of all the hon. district secretaries, which was seconded by Mr. T. de Courcy Meade (Hornsey) and adopted.

On the motion of Mr. Godfrey, Messrs. Simpson (Blaby), Silcock (King's Lynn), Eachus (Edmonton), and Radford (Putney) were elected scrutineers, and Messrs. Creer (York) and Parker (Hereford) auditors.

The meeting then proceeded to the reading and discussion of papers, but we must break off our report here until next week.

Illustrations.

SCULPTURE.

THE two sculpture subjects illustrated were two of the finest works in the Old Salon at Paris of this year. M. Falguière's fine and energetic figure of "Poésie Héroïque" was conspicuous facing the principal entrance; it may be taken as illustrating the type of Greek lyric poetry described in Wordsworth's lines—

"Woe, woe, to Tyrants!" from the lyre
Broke threateningly, in sparkles dire
Of fierce vindictive song.

Indeed the figure might almost have been made to illustrate these lines; but that we fear French artists are little acquainted with Wordsworth. The figure is a difficult one to render justice to in a single illustration, as the view which gives, as this does, the profile of the features, misses the best view of the action of the figure as a whole, as the left leg is seen too much foreshortened. The work is perhaps not equal in sculptural quality to one or two former productions of the artist, but it is certainly one of his most original and vigorous conceptions.

The statue of "L'Architecture," by M. E. L. Barrias, was designed as a figure for the tomb of an architect; it is a nobly posed monumental figure, pathetic in expression without being sentimental, and was regarded by some critics as the finest work in sculpture of the year.

INSTITUTE OF CHARTERED ACCOUNTANTS:

PART OF FRIEZE GREAT SWAN ALLEY.

This and the other illustration of the same building are reproduced from an illustrated monograph of the building, which is noticed more in detail under the heading of "Books" in this issue. This plate shows the end of Mr. Thornycroft's frieze, illustrating the arts and crafts connected with building. The figure of the Surveyor is at the extreme end, next the Architect; then follow the Workmen, each with his appropriate tools. The decorative carving in the lower portion is by Mr. Harry Bates. The architect of the building is Mr. John Belcher.

ANGLE VIEW OF BUILDING.

The corbel under the oriel is formed of the arms of the Institute of Chartered Accountants, with two supporting figures, the work of Mr. Harry Bates. The figure of "Justice" above is by Mr. Thornycroft. The view gives a general idea of the architectural treatment of the building as seen in perspective; the detail elevation of the principal front was published in the *Builder* of August 27, 1892, and the plans and sections, with a smaller elevation, were given in the *Builder* for January 12, 1889.

DESIGN FOR CLARENCE WING, ST. MARY'S HOSPITAL, PADDINGTON.

This drawing, which is exhibited at the Royal Academy, is a perspective view of the design submitted by the architects, Messrs. Salter & Adams, in a competition limited to six architects. The competitive designs appear to have been, as we understand, entirely thrown over, and no one of them is to be executed.

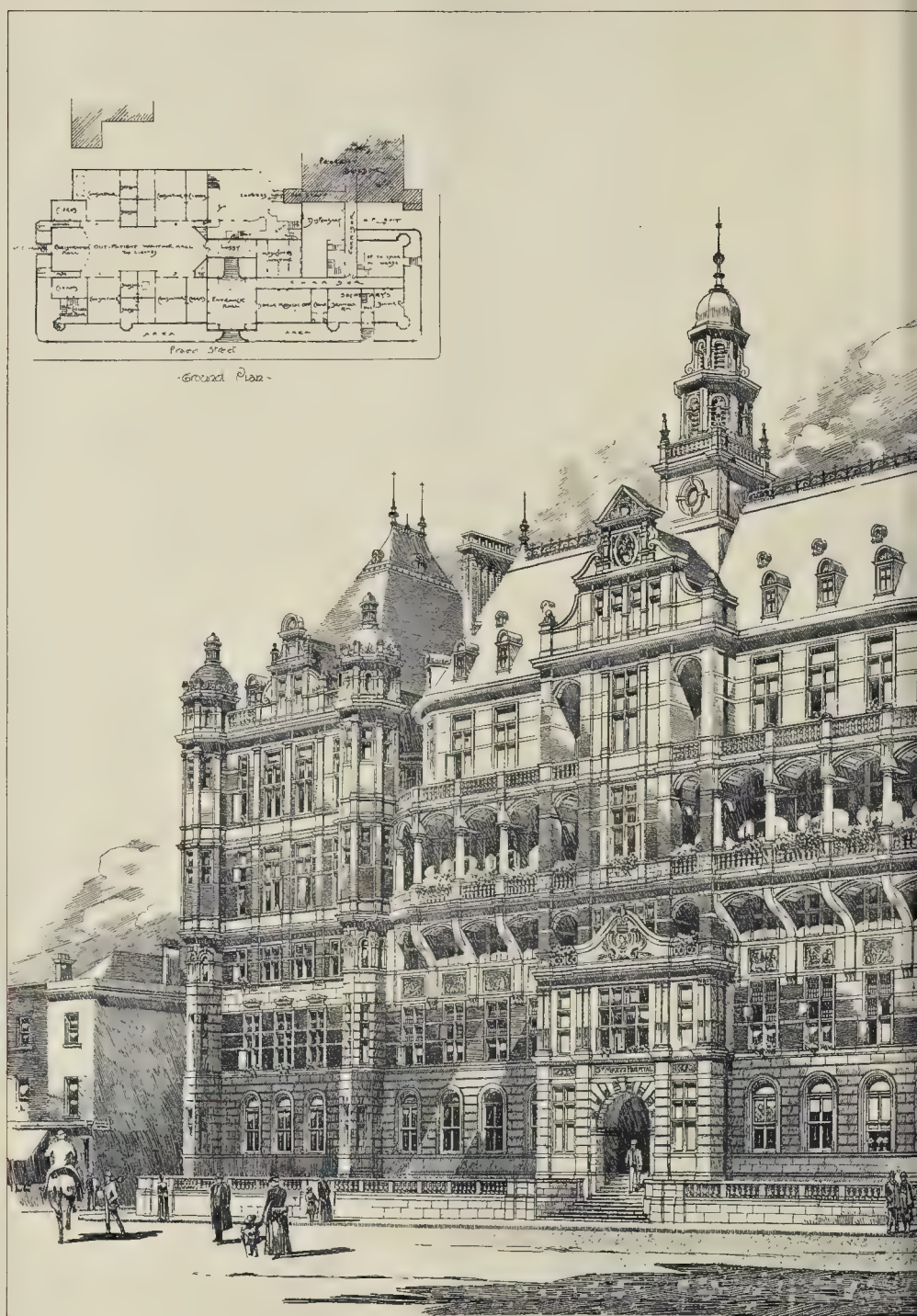
The small plans appended to the drawing give the general arrangement of the building. The authors in their descriptive report claim to have given careful consideration to light, air, and ventilation for the special wards, and they have secured the circulation of air on three sides of each ward, as will be seen by the block plan, which is very well arranged in this particular. The wards were intended to have a window on each side of each bed, the upper lights falling as hoppers, the lower opening inwards as casements, thus getting the advantage of solid frames, and no casings with spaces for the harbouring of vermin; on the importance of this we entirely agree.

The elevations were designed to harmonise with the present hospital buildings; the walls were intended to be faced with red brick and terracotta dressings. The cost of the building was estimated at 47,671.

PROPOSED HOTEL AT FUNCHAL, MADEIRA.

The site of this hotel, occupying over 10 acres, is on high ground sloping towards the sea, about three-quarters of a mile west of the town.





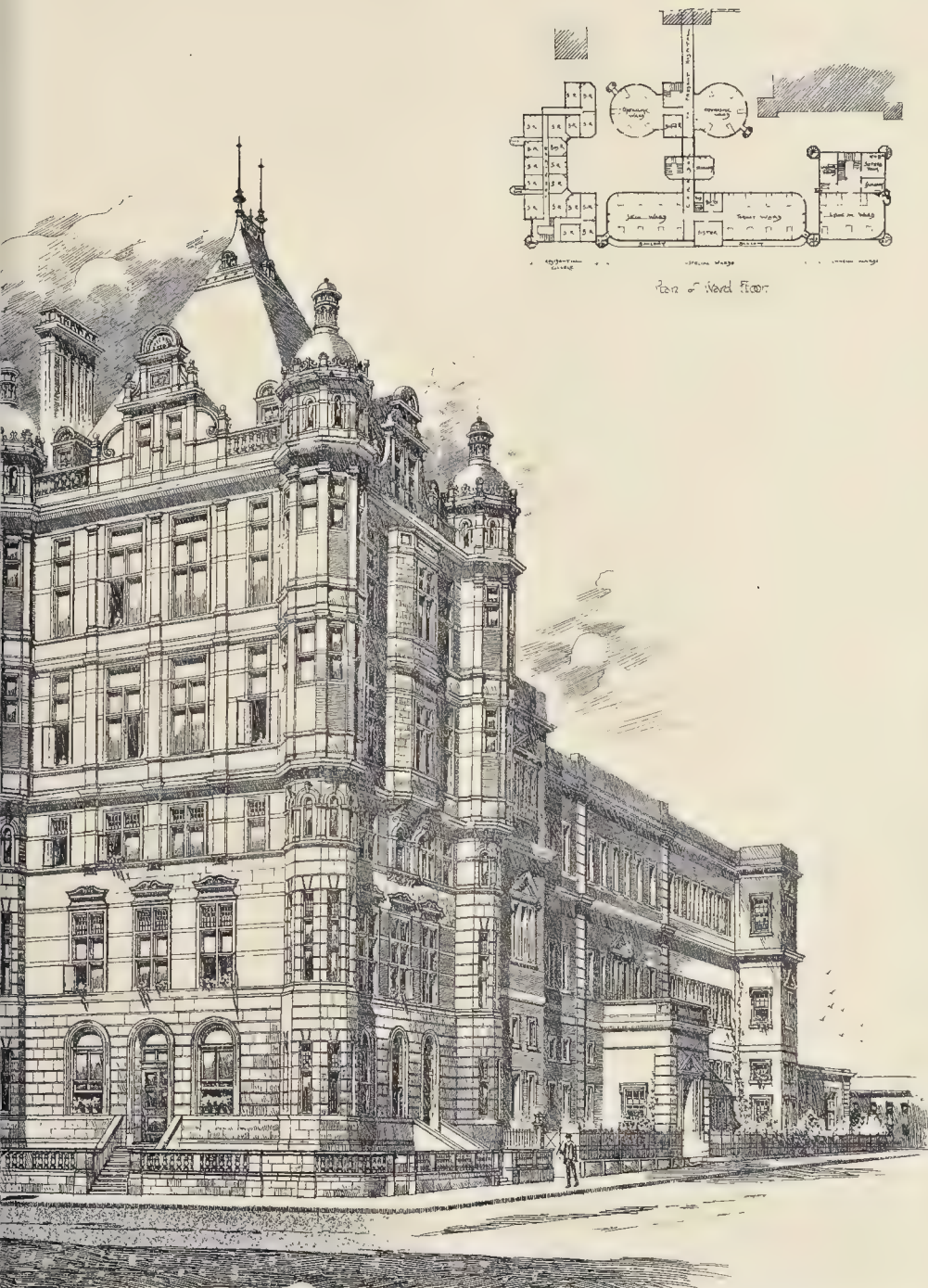


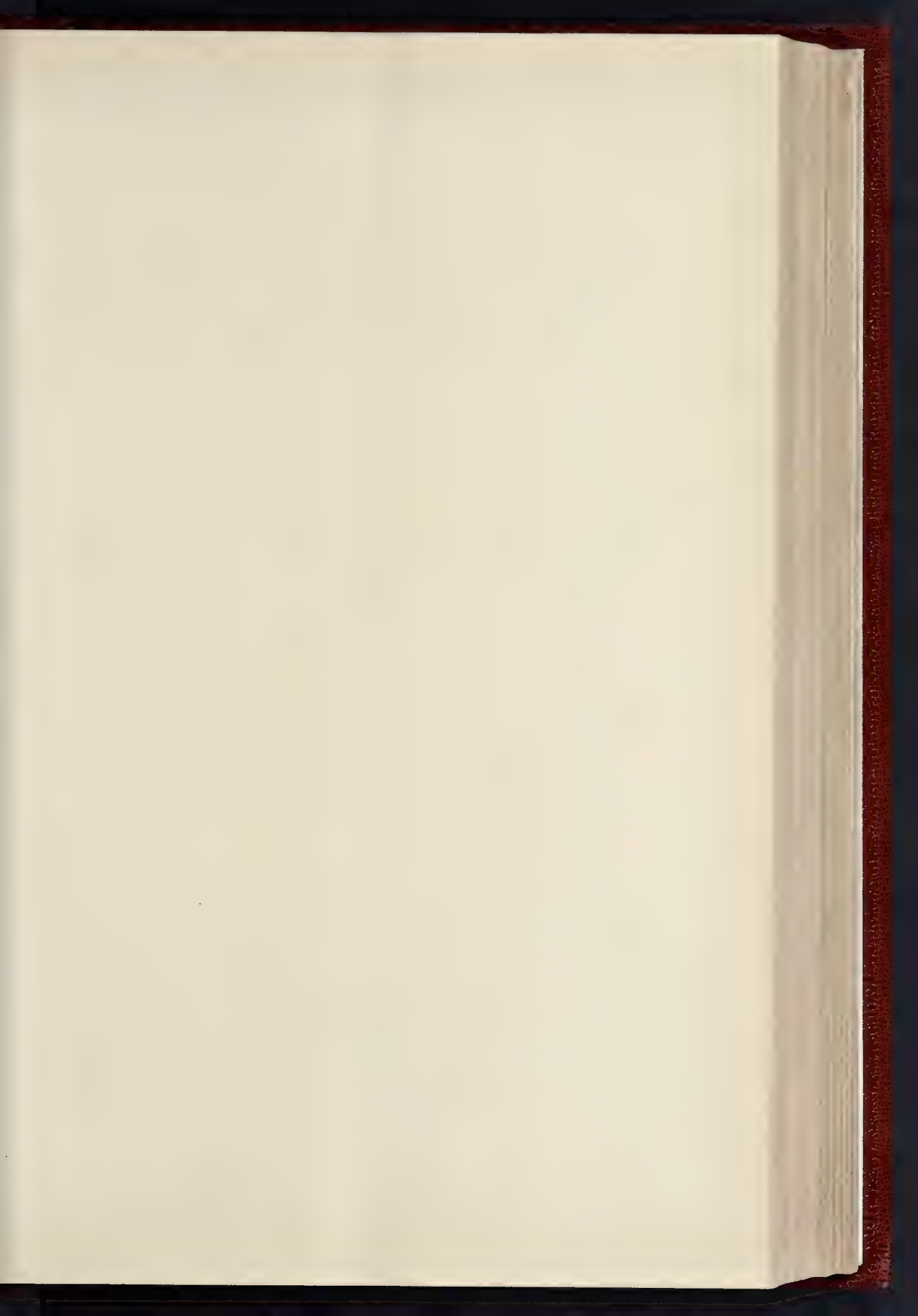
PHOTO LITHO SPRAGUE & CO. 48 & 49 EAST HARDING STREET, PETER, LANE, E.C.

CLARENCE MEMORIAL WING.—MESSRS. SALTER & ADAMS, ARCHITECTS.

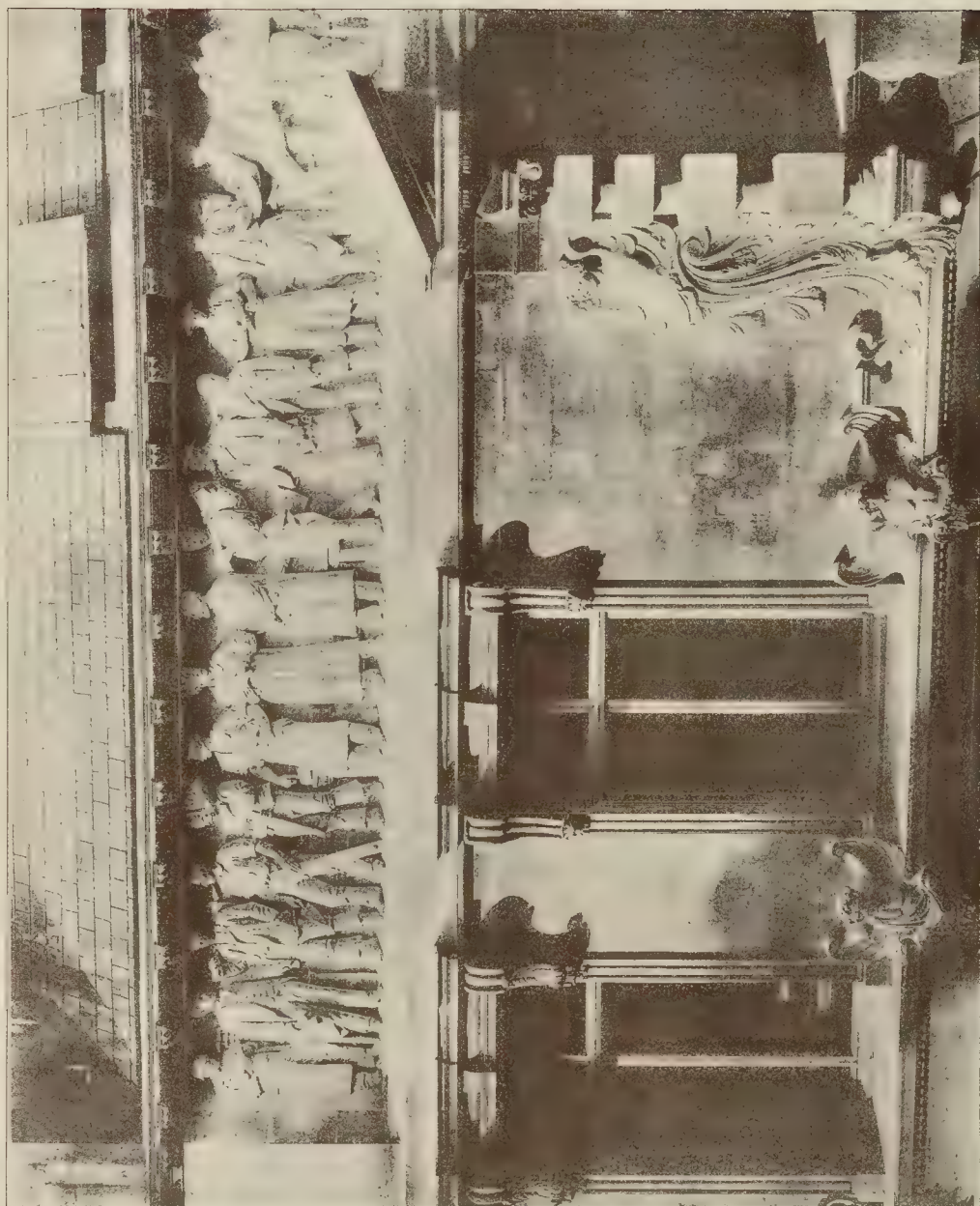
THE BUILDER, JULY 22, 1893

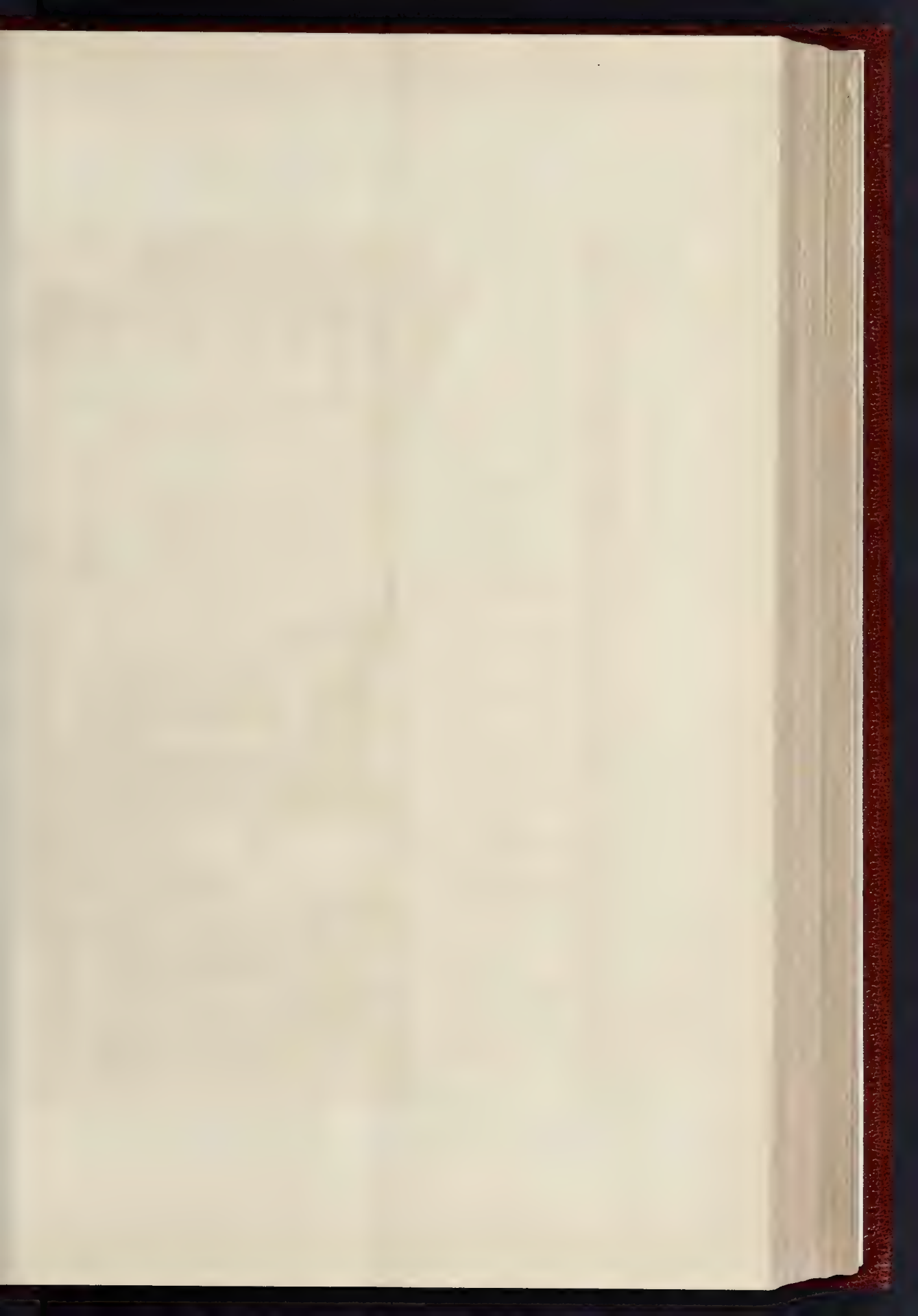


PROPOSED HOTEL, MADEIRA: MAIN FRONT.—MR. HENRY ROSE, ARCHITECT.



THE BUILDER JULY 22, 1893





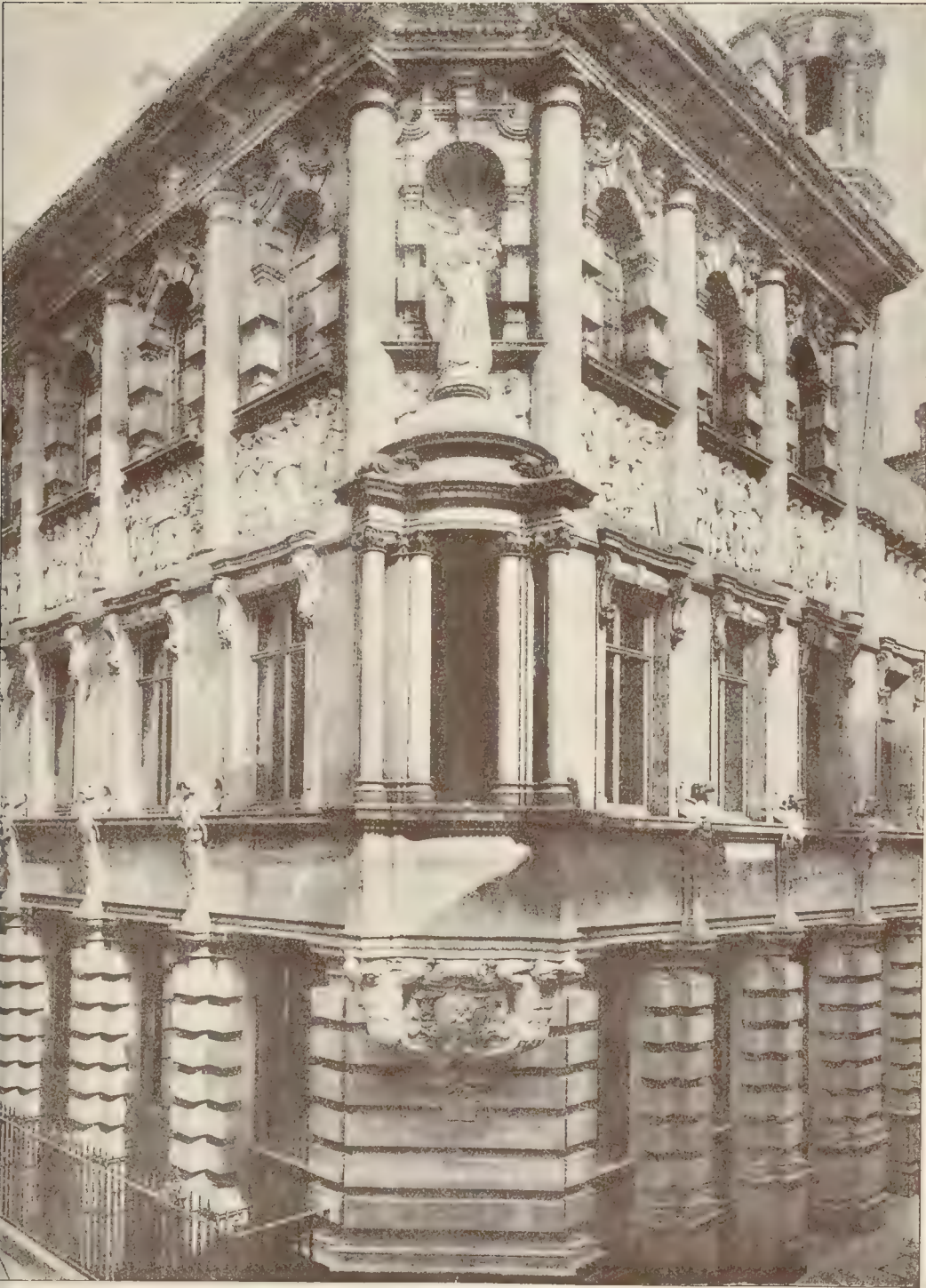


"POÉSIE HÉROÏQUE"—M. FALGUIÈRE, SCULPTOR



THE PHOTOGRAPH BY A. C. & S. EAST HARDING STREET LONDON E.C.

"L'ARCHITECTURE:" STATUE FOR THE TOMB OF THE ARCHITECT GUÉRINOT.—M. E. L. BARRIAS, SCULPTOR.



INSTITUTE OF CHARTERED ACCOUNTANTS—MR. J. BELCHER, F.R.I.B.A., ARCHITECT
VIEW AT ANGLE OF BUILDING.



PROPOSED HOTEL MADEIRA GARDEN FRONT MR HENRY ROSE, ARCHT. R.C.E.

regret that the arrangement of the diagrams is not quite perfect. For example, the incorrect alignment of figs. 9 and 10 renders their comprehension less easy, whilst the printing of dependent diagrams like figs. 12 and 13 on two sides of the same leaf is troublesome, and this is particularly unfortunate, as the thorough comprehension of the principle of the polygonal frame is of extreme importance to enable the student to make use of the valuable account of stress diagrams further on.

On p. 144, in the introduction to the working of stress diagrams of roofs, there are one or two points that would benefit by a little more explanation. It is not quite clear if $2W$ is the load on a roof truss (king-post), and w is the load on the tie-beam, why the reaction of each support is $W + \frac{w}{4}$ instead of $W + \frac{w}{2}$. In drawing the

stress-diagram for this roof, explanation should be added why certain dimensions on the vertical line are measured from particular points to represent certain forces. Despite, however, some few instances of this kind, the book is a very useful and helpful manual of architectural mechanics, and really contains sufficient to enable a careful and painstaking student to grasp the principles bearing upon the majority of building problems, including such subjects as domes, spires, vaulting and hammer-beam roofs, the consideration of which is sometimes ignored in books professing to deal with the mechanics of architecture.

Dangerous Structures. By GEORGE H. BLAGROVE. London: B. T. Batsford.

As a "handbook for practical men," the subtitle given, there is little in this small volume that would add to the knowledge already gained from experience, whilst for students, the value of the work is diminished by some rather doubtful advice. For instance, it is claimed that concrete under footings act as a lintel, but this, though true in some instances, rather begs the question when the concrete is inserted in short lengths beneath existing walls, or as it usually called, in underpinning. The use of expansive concrete again needs much care or danger may ensue. In using buttresses to strengthen a failing wall, it should be noted that a good longitudinal tie in the wall itself is absolutely necessary, and the practice is rather in conflict with what is rightly pointed out in speaking of the support of roof trusses. Some of the diagrams are defective, thus in fig. 5 "the point G" referred to is not marked, and in fig. 8 there are two G's and no B, as mentioned. Such carelessness in editing lessens the value of the book to a student, whilst those who can understand the diagrams despite their faults do not need the book. The tables of strength of beams and struts are a premium on laziness, and fill up space that might be more usefully occupied.

Correspondence.

To the Editor of THE BUILDER.

ARCHITECTS' CHARGES.

SIR,—The question of architects' charges having been raised, permit me to state what I believe to be a correct view of the position.

1. The "Schedule of Practice and Charges" issued by the Royal Institute of British Architects sets out the charges for professional remuneration, usually and properly made, under ordinary circumstances, and in the absence of any agreement to the contrary. It is presumed to represent accurately the custom of the profession in such matters, and to supply a satisfactory standard for such remuneration.

2. Every member of the Institute is at liberty to assess the value of his services at any amount he may think proper; but he must secure himself by agreeing to terms with his client before undertaking his commission.

3. If he undertakes work at rates below the ordinary custom, he must not do so to the detriment of a professional brother by under-bidding him.

4. That in all cases previous agreement with the client is desirable, and when deviation in excess of the Institute Schedule is contemplated is absolutely essential. This question of previous agreement has been fully considered in the R.I.B.A. "Journal of Proceedings," Vol. VII. (1891), pp. 161-164: "Architect and Client—written agreements."

In short, I am not aware that, except as regards professional honour, the Institute controls, or

could control, its members in the matter of charges, but leaves them at liberty to charge "what they think fit, and in their own way"; but it does by the Schedule of Practice and Charges distinctly declare what is the established practice of the profession.

ARTHUR CATES.

7, Whitehall Yard, S.W., July 18, 1893.

THE GLASS PAINTING TRADE.

SIR,—Our attention has been called to a report of a meeting of the "Glass Painters' Union" which was published in your issue of June 24. In this report we notice that various allegations were made with regard to our methods of work, which were not strictly correct, and which are calculated by their exaggeration to mislead public opinion.

In the first place we wish to state that no strike or "lock out" whatever has occurred in our workshops: we have simply discharged two men, "ornamentists" (one being a "unionist" the other a "non-unionist" for their incapacity, just as any other firm would have done in similar circumstances. Now the main objection to the system of "piece work" in our shops, as alleged at the meeting, seems to be that the wages of these "ornamentists" had been, they said, so reduced as to bring them down to the "sweating" level of 6d. per hour, or, in fact, to starvation wages.

On examining our wages-sheets for the last six months we find that from December 1, 1892, up to June 1, 1893, the average weekly wages of these two men amounted to 17. 14s. 6d., whilst their "time" shows an average of seven and a half hours per day, at an average rate of nearly 10d per hour.

It should be noted that this average of pay is inclusive of all the holidays of Christmas, Easter, and Whitsuntide, so that this rate of pay is somewhat higher per hour than is stated.

As regards the specific charges of alterations and reductions in the prices of work, after they were executed, such assertions are not founded on facts; for in each of these cases which were cited, these two ornamentists were plainly told beforehand that in consequence of reductions in the prices to our clients, the costs of production would have to be reduced (as well as the elaborate style of the ornamental details on which they worked), and knowing this, they accepted these works at reduced prices. This can easily be proved by competent witnesses in the workshops.

The class of ornamental work which was executed by these men was not up to the standard required in first class designs; such type of work as theirs was could be done quite as well by the apprentices, and it must be clearly understood that these "ornamentists" who were discharged were not "artists" in the true sense of the word, such as the "figure" painters are. Their places are now filled by competent hands, in fact one man can do as much as the two did, and in a superior style, whilst earning the same wages (and even more now), with mutual advantage to himself and to us.

Any advances in prices, such as were so unfairly quoted in the report of the meeting, were made by our manager to these men, solely with the view of helping them over the change of system from "day" work (which was a ruinous one to us) to "piece" work, and this change was carried out in a kindly spirit, but such concessions are now turned into accusations against us.

We can only say now that the work which is produced in our workshops under our present system is far superior to that which was formerly done under the "time wage" system; and as we find that this present mode of working is of advantage to our men and of satisfaction to ourselves, we do not see any reason for altering it.

CON. SONS, BUCKLEY, & CO.

DRAWINGS OF OLD LONDON.

SIR,—In your report of the proceedings of the Royal Archaeological Institute on Tuesday, the 11th inst., the writer has kindly mentioned my drawings of Old London, which are still being exhibited at the Guildhall Art Gallery. If he had also done me the honour of looking over the enclosed catalogue, which I wrote to accompany these drawings, he would have seen that they are not intended as a series of architectural exercises, but as a contribution to the history of London. With few exceptions, I have selected buildings which were more or less in danger of destruction, and I think that in every case my subject is either picturesque or historically interesting, or both. To take typical instances, the chief reception-room at No. 10, Downing-street is not beautiful; but it has been associated with most of the leading English statesmen for about a hundred and sixty years, the Chapter Coffee-house was perhaps even uglier, but it was interesting from the fact that distinguished people had resorted to it, and it is now destroyed. Various old taverns and almshouses were quaint and illustrated a past phase of life, while I think every unprejudiced person must admit that such buildings as the "White Hart," Sir Paul Pindar's, and Scarishead House, were for every reason worthy of record. Of the sixty-six specimens named in the catalogue, about

one half have either disappeared or are now condemned to demolition. PHILIP NORMAN.

* Mr. Norman's catalogue, which he has enclosed, is a very interesting and useful memorandum of a number of old buildings in London, with notes of some of the historical and literary associations connected with them.—ED.

ANCIENT MONUMENTS IN THE CRYPT OF ST. JAMES'S, CLERKENWELL.

SIR,—Adverting to Mr. Chittenden's letter (*ante*, p. 32), I find against the chancel wall, north, a remarkable figure, partly buried, in a shroud, upon a modern base inscribed thus:

"Sir William Weston Knt. Lord Prior of the sixth or English Langue of the Order of St. John of Jerusalem died 7th of May 1540 and was buried on the north side of the chancel of the church of St. James Clerkenwell. This effigied effigy sole relic of his splendid tomb skeletoned on the demolition of the old church A.D. 1788 was in the year 1882 placed near its original site by Lieut. Colonel Gould Hunter-Weston of Hunterston co. Ayr."

At the demolition Weston's leaden coffin was found a few inches below ground: the body had been embalmed: no cere-cloth or habit of his order splendid tomb skeletoned on the demolition of the old church A.D. 1788 was in the year 1882 placed near its original site by Lieut. Colonel Gould Hunter-Weston of Hunterston co. Ayr. At the demolition Weston's leaden coffin was found a few inches below ground: the body had been embalmed: no cere-cloth or habit of his order splendid tomb skeletoned on the demolition of the old church A.D. 1788 was in the year 1882 placed near its original site by Lieut. Colonel Gould Hunter-Weston of Hunterston co. Ayr. At the demolition Weston's leaden coffin was found a few inches below ground: the body had been embalmed: no cere-cloth or habit of his order splendid tomb skeletoned on the demolition of the old church A.D. 1788 was in the year 1882 placed near its original site by Lieut. Colonel Gould Hunter-Weston of Hunterston co. Ayr.

The Rev. F. R. Keightley, Curate of St. James's, who has very courteously made me the inquiry, tells me they have not, to his knowledge, a memorial of any other prior; the effigy was found in the crypt some years ago; and the crypt is cleared of its former contents.

Weston, who died on the day of his surrender, was not, as he is commonly styled, the last Prior of St. John's, for in 1537 Mary appointed Sir Thomas Tresham, buried (1539) in St. Peter's, Rushton—see Bridges' "Northamptonshire" by Whalley, for his tomb and effigy there. The last pre-Reformation Prior of St. Bartholomew's was Robert Fuller, Abbot of Waltham Holy Cross, succeeding Bolton in 1532. I am authoritatively informed there is no memorial to Fuller in St. Bartholomew's. Of other monuments cited in the *Builder* of October 2, 1858, the positions have been changed. Burnet's (by R. Hartshorne) is on the north wall of the south-west staircase (his leaden coffin was discovered on September 9, 1788, near the altar). Mrs. Partridge's is on the south wall of the north-west staircase, and Wood's on the chancel wall, south, close to the Countess of Exeter's. The brass of John Bell, Bishop of Worcester, 1539-43, buried in St. James's in 1556, was recovered and replaced nine years ago.

July 13, 1893.

W. E. D.-M.

NORTH'S APPLIANCE FOR HOLLOW WALLS.

SIR,—I have to thank you for your favourable notice in this week's issue of your valuable paper of my patent for keeping hollow walls clear. You mention that the invention is only applicable when ties are not used; this is not so, as the appliance is placed on top of the bonding bricks or ties and taken out, emptied, and replaced on the next course of ties, and so on to the top, i.e., a similar operation as occurs with battens or hay-bands.

Trusting you will do me the favour of stating this important point as the present notice would be likely to give one a misapprehension of the usefulness of my patent, ED. NORTH.

P.S.—The appliance is in use on the extensive barrack buildings now being erected for the War Department at Portsmouth, where bonding bricks every fourth course are being used. E. N.

GRAY'S INN.—Some alterations of a rather extensive kind are in course of being carried out at Gray's Inn for the Benchers, under the superintendence of Mr. Isaacs, Surveyor to the Society. What has hitherto been the Steward's Office, underneath the old library, is being converted into a "Benchers' Parlour," with a new entrance on the south side into the hall, and the joists and flooring of the library above are to be relaid. The Steward's offices are transferred to the ground floor of the library (new) buildings, overlooking Gray's Inn-road. We understand that the idea of building a new chapel in the gardens is, for the present at any rate, relinquished. Meanwhile the interior fittings of the chapel are to be rearranged in order to render it more convenient for Divine service. This will be good news for the rooks, some of whom returned after the "scare" caused by the building of the students' examination shed.

The Student's Column.

GEOLOGY IV.

THE IGNEOUS ROCKS (CONTINUED).

Volcanic History of Britain.

VOLCANIC energy has been rife throughout all geological periods, though, so far as the British Isles are concerned, the action has been spasmodic. We have evidence of this in the aqueous rocks: first, by the occurrence of lavas and ashes sandwiched between certain of them; secondly, by the intrusion of dykes into them; and thirdly, by physical peculiarities. As might be anticipated, the Lower Palaeozoic rocks give abundant evidence of volcanic activity during their formation. In Britain, for instance, a great portion of Snowdon, Aran Mowddwy, and Cader Idris are constructed of materials erupted from volcanoes of Primary age, some of which were probably submarine. On ascending Snowdon several layers of volcanic tuffs and ashes are seen interstratified with beds of Bala age containing many fossils. It must not be imagined, however, that the Welsh mountains alluded to owe their present contour to the accumulation of volcanic products in the same sense, for instance, as do Etna and Vesuvius. In the case of the latter their shape has been very little interfered with, but the old Silurian volcanoes of which we speak have undergone many vicissitudes, and the present contour of the mountains in which they are found has little or no connexion with their volcanic origin. This remark applies generally to all but the later Tertiary eruptions.

The Old Red Sandstone period was an epoch of continued volcanic activity in parts of Scotland; and the same districts were much disturbed during Carboniferous times from the same cause. In the south-west of Scotland a few vents are found of Permian age, and the New Red Sandstone of the south-west of England likewise gives evidence of contemporaneous eruptions. But probably the most striking volcanoes (by reason of their comparative freshness) in Britain, are those in Mull and adjacent islands, and in Antrim, which are of early Tertiary age. Every one knows the Giant's Causeway and the Isle of Staffa, where grand examples of the structure of lavas on a large scale may be seen.

Thus we find that some of the aqueous rocks are much cut up by the intrusion of volcanic dykes; veins of igneous rock have bored their way through them, causing much disturbance. The effects on weathering of the combined rocks frequently produce characteristic features in the landscape.

Age of the Plutonic rocks.—It is not always easy to determine the age of plutonic rocks; from their nature they are not usually very intimately associated with the aqueous, and thus their precise chronology is frequently uncertain. So far as the British Isles are concerned they chiefly belong to the Archæan and Primary epochs, though some are Tertiary. They mostly occur as large masses rising up through the aqueous and surrounding rocks, which show evidence of having been baked along the points of contact. Occasionally pieces of the latter have been broken off, and are found enveloped by the igneous rock, which throws veins into the adjacent strata. If the geological age of the rocks into which the veins have been injected can be determined, and they usually can, we are presented with a certain amount of correlative or negative evidence as to the age of the plutonic rocks. Thus, assuming the latter gave off veins into the Old Red Sandstone, we should know that it was not so old as those strata. And if the same plutonic rocks, having been denuded, were subsequently partially covered up by strata which fossils demonstrated to belong to the Triassic, we should know that they were intermediate in age between the Old Red Sandstone and the Triassic. More than that it is not often possible to say.

THE METAMORPHIC ROCKS.

We have stated that metamorphic rocks have been formed by the alteration of both igneous and aqueous, and this was due to the exertion of enormous pressure, and in presence of great heat and chemical activity. How this was brought about we will now endeavour to explain. The student will understand that the cooling of the earth in its original state must have been accompanied by much disturbance, and great contraction in the size of its mass. It may be assumed that by the time the aqueous rocks commenced to be formed, the earth had practically settled down—it had contracted nearly as much as it ever

intended to do. We know, however, that the earth is still cooling—it gives off more heat every year than it receives—and therefore it must to a certain extent be contracting at the present day. That it has continued so to do from the commencement of its existence, and, consequently, through all geological time, is practically certain. Indeed, we have evidence of it in the rocks, in the shape of mountain ranges, for the cooling of the body of the earth necessarily puckered its crust. During the elevation of these mountain ranges the rocks composing them were subjected to all kinds of strains, and marvellous pressure must have been exerted. Now, we know that moving pressure produces heat, and we are also aware that rocks can be melted by great heat. It is clear then that igneous rocks may be partially accounted for in this manner. By far the larger proportion of the rocks concerned in the elevation of our great mountain ranges, however, although subjected to enormous heat, never quite melted, but were so severely handled that a total change in their character took place, and they formed what are known as metamorphic rocks. Slate and crystalline limestone (statuary marble) are good examples of such rocks.

We have given some idea of the origin of metamorphic rocks, and collaterally of mountain ranges, but they may be partially accounted for in other ways. The prime factor in their formation is pressure, which may be induced merely by the weight of the rocks themselves, in which case it has no connexion with the secular cooling of the earth, or of the strains resulting therefrom. Aqueous rocks may have become metamorphosed in the following manner. We know that they were laid down in water and are largely composed of sediment and debris due to the wasting away of the land, and also of the remains of organisms which lived and died in the water. Throughout untold ages this action has been going on, until vast thicknesses of aqueous rocks have accumulated. The weight of these is such that the lower portions of them are in the presence of conditions quite capable of producing metamorphism. Further, the increment of pressure (and of heat) due to the slow accumulation of the strata has produced stupendous strains by causing the rocks at some depth gradually to expand, and great earth movements were the result. From this, the student will observe that the daily deposition of sediment on the sea bottom is directly connected with elevation and depression of the land.

The actual change produced in rocks by metamorphism will be discussed in another article, but it may now be stated that the amount of that alteration depends very materially on the amount of the pressure, controlled by surrounding circumstances. In some cases the original character of the rocks has been totally obliterated, and the metamorphism seems to have so transformed them as to cause them to present considerable resemblance to some igneous rocks, thus constituting a transition between the two classes. In other instances the metamorphism has not been sufficient to effect such a great change, and although the strata operated upon have been much altered in character they still retain traces of fossils, sufficient indeed to enable them to be properly classified amongst the aqueous rocks.

Metamorphic rocks may be of all ages except the most recent, and although the oldest strata have, by reason of their greater antiquity, usually been affected more than the newer formations, this is not always the case. In this country they are almost entirely confined to the Archæan and Palæozoic epochs; but in the Alps, which received their final elevation in late Miocene or Pliocene times, and in other parts of the world, there are good examples of metamorphosed rocks of Tertiary age.

THE TOLLAN ROCKS.

Except, perhaps, in China, New Zealand, and parts of Africa, these rocks do not play a very conspicuous part in the formation of the earth's crust. They are familiar to us in this country, in Holland, Belgium, and the south-west of France, in the shape of large superficial beds of sand, situated not far from the sea-coast, and are known generally by the name of sand-dunes. They have been formed by the action of the wind, which has caught up the grains (often from the sea-shore) of which they are composed, and after blowing them some distance has permitted their accumulation. They may be described as shifting sands, and have much exercised the ingenuity of people to arrest their progress. They usually present a characteristic outline, sustain a peculiar vegetation, and, from their unique appearance, have frequently formed subjects for the artist's brush.

GENERAL BUILDING NEWS.

PUBLIC BATHS, HALIFAX.—On the 6th inst. the new baths erected by the Halifax Corporation at Woodside, Haley Hill, Halifax, were opened by Alderman J. Whitaker. The front block contains the first-class slipper baths for ladies and gentlemen, with separate entrances, corridors, and waiting-rooms, with the ticket office placed between. Behind the ticket office is a large room for stores, &c. The caretaker's house is placed at the town end of the front block. The large swimming bath is behind this block, and is entered from both corridors by a short flight of steps. On each side of the swimming baths are the ladies' and gentlemen's second-class slipper baths. The large swimming bath is 75 ft. long and 36 ft. wide, with a depth of water of 3 ft. at the shallow end, and 6 ft. at the deep end. The walls and bottom are composed of concrete, faced with ivory-white glazed bricks in cement. The water in this bath is heated by steam by a process patented by Mr. Williams, one of the architects. The building enclosing the swimming bath is 90 ft. long and 54 ft. wide, and 21 ft. high to the square. The roof is carried by arched steel principals, on the top of which is a lantern light the whole length of the building. This main roof is continued over the second-class slipper baths on each side. There are eighteen dressing boxes on each side of the swimming bath, over which there is a gallery for spectators. There are staircases communicating to the gallery, both from the bath for the bathers, and from the entrance corridors for the general public. The laundry, with boiler house under, is at the low end of the site, attached to the main building, and connected therewith by a separate corridor. The main building generally is heated by steam. The baths were designed by Messrs. Horsfall & Williams, architects, Halifax, the successful competitors in a competition promoted by the Corporation, and have been carried out under their supervision. The total cost of the building, laundry fittings, &c. (exclusive of site), will be about 7,000l. The works have been carried out by the following contractors:—Thos. Pickles, Luddenden Foot, mason; Joseph Hanson, Claremont, carpenter and joiner; John Naylor & Son, Halifax, plumbing, glazing, and steamfitting; John Marshall, Hipperholme, slating and plastering; Margatroyd Bros., Halifax, painters; Geo. Greenwood & Sons, Halifax, concreting; John Berry, Halifax, iron-founder; Handyside & Co., Derby, steel roof; W. H. Haywood & Co., Huddersfield, patent glazing. Mr. H. Wilson was the clerk of works.

FREE LIBRARIES, NETHERTON AND WOODSIDE, YORKSHIRE.—Lord Dudley laid the foundation-stones a short time since of two free libraries, situated near Dudley. The site of one building is at Woodside, while the other will be at Netherton, in the Market-place. The building at Netherton includes a public hall, 56 ft. by 36 ft., with a stage 36 ft. by 24 ft. There are dressing and retiring rooms connected with the main building by a corridor, and under the stage is storing space for scenery, &c. From the entrance hall a stone staircase leads to a gallery, which will hold from 250 to 300 people, the floor being able to accommodate about 700. There are ample exits in case of fire or panic. Adjoining this is a free library, consisting of a reading room and lending library, and there are also caretaker's rooms and places for providing teas, &c. There are also a fire station, three houses for married policemen, and two cells, and a shed for tramps. The style of the building is Queen Anne, and the material used is red brick with stone dressings. The cost will be about 5,600l. At Woodside the buildings comprise a lending library, reading-room, and recreation-room. There is also a retiring-room and a stage in the recreation-room, with fire station, two police houses and a cell. The cost will be about 2,800l. Mr. T. Grazebrook is the architect; Mr. D. Willetts, Old Hill, the builder of the Netherton Free Library and Public Hall; and Messrs. Webb & Round, Dudley, are doing the work at Woodside.

SCIENCE AND ART SCHOOLS, HIGH WYCOMBE.—The foundation-stone of the new science and art and technical schools was laid at High Wycombe on Monday, the 10th inst., by Viscountess Curzon, the wife of Viscount Curzon, M.P. for South Bucks. These new buildings are to be erected in connexion with the scheme of technical education in South Bucks, about one-third of the money being raised by voluntary subscriptions locally, and the total cost being about 2,400l. Mr. H. Flint, of High Wycombe, is the builder, and Mr. Arthur Vernon, of 29, Cockspur-street, London, the architect.

REBUILDING OF THE "ROCHESTER CASTLE," STOKE NEWINGTON.—The rebuilding of the "Rochester Castle," High-street, Stoke Newington, is nearly completed. The lower parts of the building are built of polished grey and red granite, and from the first floor upwards the main façade is of red brick with stone dressings. The sculpture work of the frieze has been carried out by Messrs. Harry Hems & Sons, of Exeter, who have also carried out the stone and wood carving of the building. Above the central gable is carved a crouched lion. The general contractor was Mr. John Anley, of Dalston, West Hackney, and the whole of the works have been carried out from the designs and under the personal direction of Messrs. Crickmay & Sons, architects, of Parliament-street.

RESTORATION OF WESTON PARISH CHURCH, SOMERSETSHIRE.—On the 10th ult. Bishop Bromby re-consecrated the parish church of Weston, near Bath, which has been extended and restored at a cost of about 4,000*l.* The principal work has been the addition of a chancel and north and south transepts, which, like the old portion of the church, are in the Perpendicular style. New vestries, crypt, and organ chamber are provided. The church has been re-seated throughout with oak, with traceried bench ends. The gifts include a central panel of red marble for the reredos, with a figure in alabaster, representing our Lord in ascension, central lights for the stained-glass east window, and a brass eagle lectern, altar rails, and a light stone Perpendicular pulpit, with an alabaster figure of the Good Shepherd. The architect was Mr. E. H. Harbottle, of Exeter, and the contractors Messrs. Stephens, Bastow, & Co., of Bristol.

WESLEYAN CHAPEL, TOWCESTER.—The foundation stones of a new Wesleyan chapel and schools were laid at Towcester, Northamptonshire, recently. The new building will stand partly on the foundations of the old chapel and will be in the Gothic style, built of stone partly from the old erection and partly from Duston quarries, rock faced. The dressings to windows and doorways will be of Bath stone. The new erections will include a schoolroom and two vestries, also a kitchen and heating chamber in the basement. The church will accommodate about 250 people. The school will be so constructed as to give an additional number of seventy when required. The architect is Mr. H. H. Dyer, of Northampton, and the builder Mr. Thomas Wheeler, of Towcester.

CHAPEL, ST. CATHERINE'S SCHOOL, BRAMLEY, SURREY.—On the 1st inst. the foundation-stone of the chapel about to be erected in connexion with St. Catherine's School, Bramley, was laid by the Bishop of Guildford. The chapel will be about 24 ft. by 85 ft., and 45 ft. high. It will be of red sand-faced bricks (inside and outside), and the fittings will be of oak. There will be a chancel, nave, narthex, sacristy, and organ chamber. An arcade will extend across the narthex. The west window will be a circular stone one, and the other windows will be Gothic. There will be accommodation in the chapel for about 200 persons. The architect is Mr. C. H. Fowler, F.S.A., of Durham, and the builder is Mr. Bowman, of Stamford.

METHODIST CHURCH, WALTHAMSTOW.—A new United Methodist Free Church has just been opened at Walthamstow. Seating accommodation has been provided for 1,000 persons. The work has been carried out from the designs of Mr. J. Williams Dunford, of London, by Mr. F. J. Coxhead, builder, of Leytonstone, at a cost of 2,400*l.*

BAPTIST CHAPEL, BEDMINSTER.—Memorial stones of the new Baptist Chapel at East-street, Bedminster, were laid on the 3rd inst. The exterior of the building is to be of blue pennant stone with freestone dressings, and leaded windows filled in with tinted cathedral glass. The interior walls are to be stuccoed, and the open roof will be panelled with timber. There are to be galleries at the sides and east end of the chapel, with ornamental iron work. Mr. W. H. Williams, of Bishopston, is the architect, Mr. W. Galbraith being the contractor.

NEW CHURCH AT PECKHAM.—The foundation-stone of the new church of All Saints', North Peckham (the Charles Cubitt Gooch memorial) was laid on Saturday last by Mrs. Gooch and her sons. The church will be in the Early English style in red brick and stone dressings, with polygonal apse, chancel and morning chapel. Behind the western arcade a baptistry of octagonal form is planned. Under the south and north transept and chancel a groined and vaulted crypt is provided. The church is from the designs of Mr. Walter Plank, architect, of London.

CONGREGATIONAL CHURCH, TOTTERDUN, GLOUCESTERSHIRE.—On the 12th inst., the foundation stone of the new building to be erected in connexion with the Wycliffe Congregational Church and Schools, Totterdun, was laid by Mr. Albert Spicer, M.P. The style of the building is Romanesque, the walls being of pennant with freestone dressings, and the roof covered with Poole's patent tiles. The principal entrance will lead by a staircase to the church, which can also be approached on the level. The church measures 72 ft. by 40 ft., and is 30 ft. high. It will have a gallery at each end, that behind the rostrum being intended for the organ and choir. All the woodwork in the church will be of pitch-pine, and the windows are to be glazed with cathedral leaded lights. Between the church (which will seat 700) and the school are the minister's vestry and a gentlemen's cloak room. These are approached by a separate entrance, which also gives access to the choir gallery and school galleries. The school, which measures 40 ft. by 36 ft., and is 30 ft. high, is semi-octagonal in shape, and, with the gallery, which runs all round except at the rostrum end, will seat 400 adults or 500 children. Opening out of the entrance lobby is a gentlemen's lavatory, and on the other side a kitchen, with accommodation for tea meetings. In the basement is a suite of rooms. The lecture hall measures 30 ft. by 20 ft., and will seat 100. By another entrance is the infant school, with gallery for 100. The other rooms on this level are two class-rooms,

each 20 ft. by 13 ft., and two 15 ft. by 13 ft. All these rooms have solid block floors. The whole building will be heated by hot water, and ventilated by fresh-air inlets in the walls and exhaust shafts in the ceilings, connected with air-pump ventilators. The general contract is in the hands of Mr. John Perkins, the heating is by Messrs. Skinner and Board, and the gas-fittings by Messrs. Cann & Co., while the architect is Mr. J. H. LaTrobe, of Bristol. The cost will be about 3,300*l.*

NATIONAL SCHOOLS, CHARFIELD, GLOUCESTERSHIRE.—On the 12th inst., the corner stone of the new National Schools, Charfield, was laid. The building will be of native stone dug from the glebe, the same that the church is erected with. The style will be Early English, similar to the church, with worked facings. The schools are from plans prepared by Mr. W. Wood Bethell, architect, of Westminster, and are intended to accommodate ninety children. There will also be a separate building for the master's house.

BAPTIST CHURCH, MALVERN.—On the 13th inst. the memorial stone was laid for the new Baptist Church at Malvern. The church is 48 ft. in length, running parallel with Abbey-road. On the ground floor is a large lecture hall and a kitchen. The church is to be built in a late period of the Early English style, of Cradley stone with Bath stone dressings. The roof is open timbered. The architect is Messrs. Ingall & Sons, of Birmingham, and the builders Messrs. J. Smallwood, of Henley-in-Aiden.

PROPOSED HOSPITAL WING, ST. HELENS, LANCASHIRE.—We learn that the committee of the Cottage Hospital, St. Helens, are about to proceed with the erection of a new wing to accommodate thirty-two beds, giving each patient 9 sq. ft. of ward space. Mr. James Gandy, architect, of St. Helens, has prepared plans. The approximate cost is over 2,000*l.*

CONCERT HALL, LLANDUDNO.—On the 1st inst. a temporary concert hall, which has been erected by the Victoria Palace Company, Limited, was opened at Llandudno. The building, which occupies a site near the Hydrographic establishment, has been erected from plans of Mr. G. A. Humphreys, architect, of Llandudno, and measures 120 by 180 ft.

CAPITAL AND COUNTIES BANK, EAST GRINSTEAD.—New premises for the Capital and Counties Bank have just been erected at East Grinstead. The building is three stories in height above the basement, and is situated in the High-street. From the pavement level to a little below the first floor windows the material is wholly of local stone from the Honeywell quarries. On the right of the building is a semi-circular headed doorway, with moulded polished mahogany entrance door, and to the left are three large windows. Four windows, divided with stone mullions and transom, occupy the first floor story, which is crowned with a stone cornice. The upper part is designed with a shaped gable in the centre, with dormer windows and balustrades on each side. The bank is about 25 ft. by 23 ft. Here, as in the vestibule, the public space is paved with marble mosaic, while the remainder is laid with solid wood-block flooring. The counter front is of polished mahogany. The manager's room leads out of the bank. The basement, which is built of white glazed bricks, is approached from the clerks' enclosure of the bank by a flight of stone steps, and is occupied by a strong room of about 14 ft. by 12 ft. The manager's residence, corner is on the ground floor, of a dining room, conservatory, kitchen, and the usual domestic offices. On the first floor, which is approached by two staircases, are the dining room, morning room, nursery, principal bed room, bath room, linen cupboard heated with hot water, and other domestic conveniences. On the top floor are other bed rooms and store rooms. The building has been under the personal supervision of the architect, Mr. H. Edmund Mathews (of the firm of Messrs. J. Douglass Mathews & Son), of London and East Grinstead. The contractors for the work are as follows:—General contract, Mr. J. Tooth, East Grinstead; bank fittings, Mr. C. Rice, East Grinstead; painted glass and lead lights, Messrs. Kelly & Co. Finsbury, E.C.; gas fittings, Messrs. Wentworth, London, E.C.

SANITARY AND ENGINEERING NEWS.

MANCHESTER SHIP CANAL.—A further advancement is about to be made towards the purification of the Manchester Ship Canal by the purification of the sewage now flowing in a crude condition from the district of the Crompton Local Board. On the 4th inst. Mr. Frederick H. Tulloch, one of the Local Government Board Inspectors, held an inquiry at the offices of the Crompton Local Board, Oldham, with reference to the borrowing of loans amounting to 12,300*l.* for sewage purification works, public offices, and a sewerage pumping station. The Surveyor to the Board, explained the various purposes for which the loans were required, and stated that they had made provision at their sewage works to purify 225,000 galls. of sewage per day, having three precipitation tanks each of 75,000 galls., and eight small poliarie filter-beds. It was given in evidence that the effluent from the sewage filters would be better than that obtained by land treatment. It was stated that by the use of the International process

half the quantity of land only that was at first decided on will be required.

HEATLEY DRAINAGE, CHESHIRE.—The general contract for the above work has been let to Messrs. Worthington & Pownall, of Manchester, and the contract for gas-engines, air compressors, and Shone's ejectors to Messrs. Hughes & Lancaster, of Westminster. Mr. G. Herbert Bayley, A.M.Inst.C.E., Lyrm, Cheshire, is the engineer.

FOREIGN AND COLONIAL.

FRANCE.—The jury of the competition opened for the decoration of the Salle des Banquets of the Hôtel de Ville have awarded the first premium to M. Georges Bertrand, who is to receive 50,000 francs for the execution of three ceilings and eight door headings. The second premium has been awarded to M. Provost, and the third to M. François Lafon. M. Bertrand, who is a pupil of Bonnat, was the author of a fine picture entitled "Patrie," much remarked in the Salon of 1889, and which has been popularised by engraving and photographs. The statue of Claude Chappe, which was inaugurated at Paris on the 13th, is the work of M. Ernest Darné. The pedestal was designed by M. Farcy, architect. The municipality of Bry-sur-Marne has opened a subscription to erect a monument to Daguerre, who died in this small town in 1851. M. Coquart, Guadet, Gninain, Deslinières, and Paul Sédille, have been chosen as the jury to decide on the designs for the rebuilding of the Opéra Comique. Eighty-four designs have been sent in, and are now exhibited at the Palais de l'Industrie. The "Société des Gens de Lettres" proposes to erect a monument to the memory of Guy de Maupassant. The "Société Lorraine des Amis des Arts" is to open an exhibition on the 29th October '93 to remain open till December 4. The Minister of Public Instruction has just opened, at Pau, a new theatre and a new Lycée for girls. The Art Society of Besançon has just opened its exhibition of painting and sculpture. An interesting art exhibition is open at Angoulême, and is a good deal spoken of. The large picture by Roll, "Le Centenaire des États Généraux," which figured this year in the Champ de Mars Salon, has been placed in the Salle des Gardes of the Museum of Versailles, in place of the "Sacré" of David, recently removed to the Louvre. On the occasion of the National Fête on July 14, the Government conferred the decoration of the Legion of Honour on M. Damoye and M. Quost, painters; on M. Raoul Verlet, sculptor; and on M. Charles Errard, architect, of Marseilles. M. Errard is the author of some important works on the Renaissance monuments in Rome and on the Romanesque architecture of the South of France. M. Potier, architect, of Villars-Coteaux, has obtained the first premium in the competition opened by the Town of Neuilly-Saint-Front for the construction of a Hôtel de Ville. M. Hippolyte Stupuy, formerly a member of the Municipal Council of Paris, has been appointed curator of the artistic collections of the Municipality of Paris.

GERMANY.—The sized model for the equestrian statue, which should be the most important feature of the national monument to the deceased Emperor William, is just completed. The deceased Emperor is shown mounted on a charger led by an angel of peace; his attitude is dignified, and the likeness a good one. The casting in bronze will take over a year, but there is little doubt that the monument will be ready, as specified by contract, in March, 1897. Herr Halmhuder, who was selected by the Emperor to design the architectural surroundings on the "Schlossfreiheit" site, is making rapid progress, and is having full-size models made of his part of the work. The "Opfernplatz," which would have been a popular site for the national monument, is now to have a memorial to the Empress Augusta. Professor Shaper will probably be the sculptor, if the Emperor approves of his designs. The architectural surroundings and mouldings are to be put in the hands of an artist.

The list of pictures bought by the National Gallery at the International Art Exhibition has been published. All the works selected are by German artists.

The Prussian Royal Academy Schools closed their session with the usual prize-day. There were 260 students this year. The first prize for class work (30*l.*) was taken by the painter, Ernest Liebermann.

The new Berlin Waterworks Extension, at Müggelsee, was opened on Thursday. The Straulau Waterworks will now be able to diminish their supply of water by 30,000 cubic metres a day, and there will hence be more time for filtration. The daily supply in Berlin averages 150,000 cubic metres.

Besides the numerous Lutheran churches which are being built, several are being erected for the Roman Catholic congregation. Only these the St. Sebastian Church, built to hold 4,000, according to the plans of Herr Hasak, has just been consecrated. The cost of the building was about 26,000*l.*

At a competition for the design of a large "high" school for Frankfurt no less than 104 candidates sent in drawings. Herr Karl Frobenius, of Charlottenburg, near Berlin, took the first premium. The late Mr. Henry Gill, whose life was nearly entirely devoted to the Berlin Water-

works, is to have a monument erected to his memory at the new Mueggelsee Station. — Reg. Bauwesen. Wilhelm Moeller, who had just been commissioned to erect the new Provincial Museum in Berlin, has suddenly died at the age of forty. He had taken the first premium in the Museum Competition last year.

CORLENTZ.—It has been decided to commission Herr Bruno Schmitz with the execution of a memorial monument to the late Empress Augusta. Professor Most, of Karlsruhe, is to do the sculptural parts.

THE LIGHTING OF BOMBAY.—At the last meeting of the Standing Committee of the Bombay Corporation the contract with the Bombay Gas Company for lighting the city was continued for another year, from July 1, on the present conditions. The Municipal Commissioner stated that it was intended to make during the monsoon a considerable experiment with the Welsbach burner, with a view to ascertain whether it can stand the vicissitudes of rain and wind. A large number of burners will be affixed to the existing lamp-posts in Church Gate-street in the direction of the railway station, and along the Esplanade-road, where wind and weather will have free play in unbroken force. The experiments which have been made in the fort during the last few months have been very successful, the illuminating power being nearly doubled, with a considerable saving of gas. The heavy rain, which fell within the last week or two, accompanied by high wind, had no injurious effect on the burners. The economy of gas is very great—about two-thirds of the amount consumed in the old burners of the same size sufficing to give about double the light. The Welsbach burner is being extensively introduced into places of business and private houses. The amount of heat evolved is much less than that thrown off from the ordinary gas-burner.—*Indian Engineer.*

MISCELLANEOUS.

THE BRITISH SCHOOL AT ATHENS.—The Archbishop of Canterbury presided on Wednesday afternoon at the annual meeting of the British School at Athens, which was held in the rooms of the Society of Antiquaries, Burlington House. The attendance was unusually large, including Sir Edmund and Lady Monson, Lord Lingen, the Vice-Chancellor of the University of Cambridge, Mr. Edmund Egerton, British Minister at Athens, Professor Jebb, M.P., Mr. F. C. Penrose, the Provost of Oriel, Professor Clifford Allbutt, Mr. Bywater, Professor Percy Gardner, Professor Joseph Mayor, Professor Alex. Kerr (of Madison University), Mr. Ernest Gardner, the Director of the School, Mr. Walter Leaf, Dr. H. A. Holden, and Mr. George A. Macmillan, the hon. secretary. The secretary, at the Chairman's request, read the report, which stated that the year just ended was rather one of quiet progress than of sensational achievement, that the number of students admitted or re-admitted had been fully up to the average. The work at Megalopolis was this year carried to a completion under the superintendence of Messrs. Bather & Benson, by the clearing out of the Stilon. This very interesting building and the theatre now presented great attractions to all visitors. No further site for excavation had yet been decided upon, but towards the end of the season a preliminary trial was made on the site of Aegosthena, at the extreme east corner of the Corinthian Gulf. Though little was known of this city in ancient times, the extant walls, which presented a remarkably perfect example of the fortification of probably the fifth century, sufficed to show that it was a place of no little importance. The School had, as in former years, been visited by many English travellers, and had been found of practical value in supplying them with information and guidance. Mr. Egerton, the British Minister, and other members of the Legation had shown a particularly active interest in the work of the School, both in Athens and in other parts of Greece. The relations of the School with the other foreign institutes in Athens and with the Greek archaeological authorities continued to be most friendly. The committee once more urged upon all who were interested in the matter to use their utmost efforts to secure either substantial donations or annual subscriptions towards the support of the School. The report was adopted.—(Abridged from the *Times*.)

ANNUAL DINNER, MASTER BUILDERS' ASSOCIATION, LEICESTER.—The annual dinner of the members of the Leicester Master Builders' Association was held on the 13th inst. at the Bull's Head Hotel. Mr. D. Garratt (Messrs. Clark & Garratt), President of the Association, occupied the chair, and was supported by the Mayor of Leicester (Alderman J. Underwood) and others. Mr. G. Hewitt, Vice-President, having proposed the toast of "The Mayor and Corporation," and the Mayor having replied, Councillor Sawday proposed "The Leicester Master Builders' Association," and congratulated them upon their society. The President, in responding, said that three years ago they formed the Association, and their motto had been, "Defence, not defiance," and they would always try to act up to that principle. They had had a very successful year since the last anniversary. The Association had become affiliated during the year with the National

Association of Master Builders. Mr. E. G. Mayberry, Borough Engineer, gave the next toast, which was "The Town and Trade of Leicester." As showing the amount of work done lately he had found that in the year and three-quarters since the borough extension no less than 3,600 plans had been sent in for houses, other buildings, and streets. Of these nearly 2,000 were for dwelling-houses, 80 for factories, warehouses, and workshops, and 57 for new streets. He thought that was proof of the prosperity of the town. He might mention also that during the time the labour bureau was opened last winter, when 700 men were registered for work or relief, only about 20 artisans of the building trade were enrolled, besides the painters. Mr. H. T. Chambers, J.P., having replied to the toast, Mr. Hardington proposed "The Leicester and Leicestershire Society of Architects." The Councillor Sawday and Mr. J. Wigg responded to the toast, which was followed by others during the evening.

ANNUAL OUTINGS.—The employees of Messrs. Thomas Gregory & Co., builders, &c., Clapham Junction, on Saturday last journeyed to Hastings, that place having been selected for the enjoyment of their annual outing. The party consisted of over a hundred, further augmented by detachments arriving later on from various outlying works at Orpington, Farnboro', &c. The arrangements had been left in the hands of Messrs. Downs, Tucker, and Easter, assisted by a committee. At twelve o'clock the party sat down to dinner at the Central Hall, Memorial-place, by Messrs. W. & A. Newberry, to which full justice was done. At the conclusion of the dinner, the usual toasts were given; that of the "Firm" being received with musical honours. The party then scattered over the town, many taking advantage of the splendid weather to enjoy a sail.

A large gathering of employees connected with the works of Mr. Frederick Bruton, contractor, Highbury, took place on July 8, at Elstree, Hertfordshire, in celebration of their fifth annual beefeasts. Breaks were requisitioned for the day, which proved enjoyable to all.—On Saturday, the 8th inst., the employees of Messrs. Vaughan & Brown, of London, held their annual outing. Starting at 9 a.m. in brakes, they drove to the "King's Head Hotel," Egham, where dinner was served; after which, the party dispersed, some for boating on the river, others for Virginia Water and Windsor Great Forest, all assembling soon after 7 p.m. for the drive home.

MATHESON & GRANT'S ENGINEERING TRADES' REPORT.—Messrs. Matheson & Grant's report for the past half-year says that the decline in trade during 1892 culminated in the Spring of this year, but since that time there have been signs of recovery in many branches, and this improvement seems likely to continue and extend. The falling-off in the demand for all kinds of engineering material has been the more marked because of the peculiar combination of causes. Enterprise in South America had already been arrested by the failures of 1891-2, when the financial difficulties of Australasia reduced greatly the purchasing power of all the Colonies and developed into the bank failures of the present year. Since then Eastern trade has been embarrassed by the uncertainties of the silver question, which cloud the future. The metal markets have been and still are more unsettled than for many years past. The coal trade is in a most unsatisfactory condition, alike to the colliery proprietors and the consumers. At all previous times of depression the cost of getting coal has been reduced to meet the lessened demand, but present colliers' wages, which have been augmented 40 per cent. during the last four years, still remain at their high level, out of proportion to the earnings in all other trades. Steel makers, engineers, and all other large consumers of fuel look to a reduction in the price of coal as absolutely necessary to a resumption of profitable trade. Notes for lowering wages have been given throughout the country, and unless an agreement is come to within the next few days a serious and protracted strike is threatened. In France, Germany, and Belgium the relations between masters and men at the collieries are also strained, and the whole question of fuel supply is likely to influence the manufacturing industries of Europe for some time to come. Notwithstanding the reduced number of furnaces in blast, pig-iron continued to fall in price after January, till in March Scotch pig was selling at 40s. and Cleveland at 34s. per ton. Since then, values have tended upwards, a sure sign of improvement in the engineering trades. Prices now would probably be still higher, were it not that the uncertainties of the money market, both in Europe and the United States, restrict purchases for future delivery. During the last twelve months the prices of finished iron have fallen below the cost of manufacture if wear and tear of plant be reckoned, and there have been some failures among those who cannot meet these conditions. The supersession of rolled iron by steel in so many trades seems to have reached its limits; it is recognised that steel can be made more cheaply than puddled iron; and the purposes for which each is most suitable alone determine the choice. Public works at home and abroad have been restricted, and retarded by the reluctance of capitalists to invest money in any kind of new enterprise. The only compensation to be hoped for by

those who suffer by such restrictions is that, to judge by past experiences, the work to be done is accumulating for an early future. But beyond this, works started before the present dull times are still going on and are requiring material and plant of various kinds. South Africa is likely to be a good market for the engineering trades of this country, and if the present increase in gold production continues, the demand for railway and mining material will grow also. Leaving the British Colonies out of the question, Mexico, Brazil, China and Japan alone afford enough scope, but in all these there is the coming cloud of American competition.

REERDOS, BURGH ST. MARGARETS CHURCH, NORFOLK.—A reerdos has just been added to Burgh St. Margarets Church, Norfolk. It is mainly built of alabaster and marble, and has been designed by Mr. E. L. Parsons, architect. The lower part is all of Caen stone with carved and diapered panels on either side of the altar. Above is a deeply-moulded and wide super altar of polished and veined alabaster. On this stands the reerdos proper. There is a central panel, canopied, and carried above the line of the terminating cornice. In the centre, amidst crockettes pinnacles, rises the main gable, which terminates with a foliate cross, fashioned in white alabaster. The central panel is flanked by a double set of pinnacled buttresses, between which, on each side, are canopied niches, and standing upon ornamented bases are statues in the round, representing respectively the Blessed Virgin and St. Margaret. These statues, like all the rest of the sculpture, are in white Castilino marble. The central panel has a large sculptured figure of Christ rising from the tomb. The work has been carried out by Messrs. Harry Hems & Sons, of Exeter.

MONUMENTAL STATUE, LLANDNAM, MONTGOMERYSHIRE.—On the 9th inst. Mr. A. C. Humphreys Owen unveiled a statue of the late Mr. David Davies, the Welsh railway constructor, which has been erected in his native village of Llandnam, Montgomeryshire. The statue, which is of bronze, is 9 ft. in height, excluding the granite pedestal. It is the work of Mr. Gilbert, R.A., and a replica of the statue erected at Barry Docks, South Wales. The site, which is near the railway, was selected by the architect.

MURAL TABLET, WALLACE GREEN CHURCH, BERWICK, HADDINGTON.—A mural tablet, in memory of the late Principal Cairns, was dedicated recently in Wallace Green Church, Berwick. The architectural portion of the work has been designed by Mr. Washington Brown, R.A.S.A. In the panel in the centre is the head in marble of the Principal, which is the work of Mr. Stevenson, R.S.A.

MEETINGS.

THURSDAY, JULY 27.
British Institute of Public Health.—Congress at Edinburgh.

FRIDAY, JULY 28.
British Institute of Public Health.—Congress at Edinburgh (continued).

SATURDAY, JULY 29.
British Institute of Public Health.—Congress at Edinburgh (continued).

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

11,227.—NAIL-ENDED SCREW: *S. Brann and another.*—This is a combination screw-nail or nail-ended screw. The nail may be driven into any length of wood without the use of gimlet or bradawl, and then be turned in its full length by means of a screwdriver.

14,669.—SLIDING WINDOW-SASHES: *P. R. Morris and another.*—Here one sash balances the other. The sashes are hung by a chain over a small wheel or pulley screwed at the top. A lock is fitted to allow the sash to be locked at various points if the window be open.

14,668.—PLUG FOR DRAINS: *C. E. Price.*—The plug which is the subject of this patent is made of a number of separate rings arranged that each fits into the other. Two of these plates are then taken, and a rubber ring placed between them. When the plates are drawn together it expands the rubber ring, forming a plug or stopper to the drain.

14,725.—PEDESTAL WATER-CLOSETS: *E. W. Quirk and another.*—In seats, as ordinarily constructed, there is nothing to assist an invalid in rising or to prevent him falling sideways in case of a sudden attack of illness. By this invention a hand-rail or arm is fixed on each side.

17,127.—VENTILATOR: *G. H. Bartlett.*—The improvements claimed by this patent are in the direction of better fixing for ease in opening, setting, and closing the ventilator, which is effected by a small hook or catch actuated by a cord and held in position by a spiral spring. All the louvres or shutters are actuated by the one lever and controlled by the spiral spring.

16,610.—ORNAMENTAL BRICKS AND TILES: *M. Korth (Stotzhelm).*—Special appliances adapted to be fixed to machinery already in existence and designed to produce ornamental facing bricks or tiles are described in this specification. The clay is passed over cylinders on which a design is engraved. In the case of corner facing bricks, three of those cylinders are employed. Many small mechanical details are introduced into the machine to manufacture the bricks and tiles in a continuous manner.

17,620.—BRICKMAKING MACHINERY: *W. Johnson.*—The point in this invention is combining in one machine the various processes in the manufacture of bricks, that is the mixing, pugging, or kneading the material, the forming or moulding the bricks, and the ultimate process of pressing and finishing them to the required shape and size ready for conveyance to the kiln. These several operations are by means of special devices performed by a single machine.

CONTRACTS—Continued

Those marked with an Asterisk (*) are advertised in this number. Contracts pp. iv., vi., viii., and xxiii. Public Appointments, pp. xx. and xxi.

ESTATE EXCHANGE REPORT.

JULY 14.—By *S. S. Richardson*: 19. Alexandria, r.
 Horsey, ut. 54 yrs., g. r. 86, l. 384, 355. By *Reynolds*:
 20. Tripoli, r. 100 yrs., g. r. 100, l. 100. By *Reynolds*:
 u. t. 81 yrs., g. r. 67, l. 67, 100, 400. r. rent charge of
 u. r. 80s., Lewes, 86d., f. g. r. of 100. 10s., Gurney, r.
 Straford, reversion in 81 yrs., 270d., 54s. Savonia, st.
 Batesea, f. 120d.; 32, 32a. Allerton-st., City-rd., ut. 15
 yrs., no g. r., s. 50s., 120d., 57, 59, 61. Union-rd., Borough,
 u. t. 100 yrs., g. r. 100, l. 100, 100, 100, 100, 100, 100, 100.

[Contractions used in these Lists.—F. g. r. for freehold
 ground-rent; l. g. r. for leasehold ground-rent; i. g. r. for
 improved ground-rent; g. r. for ground rent; r. for rent;
 f. for freehold; c. for copyhold; l. for leasehold; e. r. for
 emulated rent; u. t. for unexpired term; p. a. for per
 annum; p. l. for place; t. for terrace; c. r. for crescent
 sq. d. for yard; &c.]

[illegible]

SLATES. SLATING. TILING.

Roberts, Adlard, & Co.

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SLATE SLAB WORKS.

EUREKA GREEN

SLATES.

SOLE IMPORTERS

FOR
MANSION,
COTTAGE,
HOTEL.

ILLUSTRATIONS.

The Shaftesbury Memorial Fountain, Piccadilly Circus—Designed by Mr. Alfred Gilbert, R.A.	Double-Page Ink-Photo.
Exterior of All Saints' Church, West Dulwich.—Mr. G. H. Fellowes Prynn, F.R.I.B.A., Architect.	Double-Page Ink-Photo.
Interior of All Saints' Church, West Dulwich.—Mr. G. H. Fellowes Prynn, Architect.	Double-Page Ink-Photo.
Design for Oxford Municipal Buildings.—Messrs. Cheston & Perkin, Architects.	Single-Page Photo-Litho.
Additions to "Roxley"—Messrs. Wimperis & Arber, Architects.	Single-Page Photo-Litho.

Blocks in Text.

Diagrams of Fireproof Floorings	PAGES 76, 77	Plans of All Saints' Church, West Dulwich	PAGE 86
Discoveries at Jesus College, Cambridge	83	Plan, Additions to "Roxley"	87

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Some Experiments with "Fireproof" Materials.



In March we referred to some tests to which various "fireproof" materials had been subjected at Berlin under the auspices of the Royal Police Fire Brigade of that city. The experi-

ments, which had actually taken the form of a competition for honours and premiums between different makers or inventors of fire-resisting specialties, were proposed by the Amalgamated German Insurance Companies as far back as 1889 on the occasion of the "Accidents Prevention Exhibition" held in Berlin that year, and it was at that time that these institutions subscribed the necessary funds for the money prizes which were to attract the trade and cover the unavoidably heavy expenses. The main object of the promoters having been to arrange their experiments as "naturally" as possible, some years had to elapse until a suitable site for operations could be found, and it was not until the Municipality of Berlin last year offered to put an extensive warehouse block at their disposal, that the preliminary preparations for the series of "fires" they proposed having could be taken in hand. The warehouse in question, which was destined for demolition on account of some street improvements, was admirably suited for the purpose; and after a careful reconstruction of the interior with the various materials and fittings the competitors wished to have tested, appeared to be almost indestructible by fire or water.

According to the official report which has now been published, a committee of eleven had to act as assessors, this committee consisting of architects, engineers, and fire brigade officers brought together from different parts of the country. Herr Stude, the late chief officer of the Berlin Fire Brigade, whose untimely death we had to report a few weeks back, was chairman to the committee; Herr Reichel, a senior officer in the same force, acted as honorary secretary, and was responsible for the

general management of all the arrangements on the site of operations. There were eighteen competitors, including the Berlin Fire Brigade (*hors concours*), whose officers wished to demonstrate the very satisfactory resistance of the ordinary building construction if only conscientiously and correctly carried out. Some five months were at the disposal of the competitors for the reconstruction and fitting of the warehouse, and three days were set aside for the experiments. Prior to commencing the actual tests, the assessors, together with a number of invited experts, representatives of the technical press, fire offices, and Government departments, carefully examined the exhibits, officers of the fire brigade explaining all details as to construction, supposed qualities of the materials, &c. The assessors and visitors found the warehouse had been very cleverly divided up in such a way as to facilitate examination of the individual exhibits intended for the special protection of certain trades, &c., without, however, interfering with the general or more severe tests these exhibits had to undergo together with other materials. Besides the different classes of living-rooms and bedrooms, there was a retailer's shop, a general warehouseman's floor, carpenters' and frame-makers' shops, an oil and colourman's store, and even a mineral-oil depot, all most "naturally" arranged, and everywhere, even in matters of minute detail, it was obvious that, as far as it was in Herr Reichel's power, great pains had been taken to insure *bond-fide* results. The tests were taken in hand systematically, first in the smaller, then in larger "risks," care being taken to let the various fires also originate as "naturally" as possible; finally, several floors and the staircase were set on fire at once, and a warehouse fire in its advanced stage represented. Care was taken to subject the exhibits to the temperatures, irregularities of temperature, sudden shocks by falling weights or jets of water, &c., which generally occur at conflagrations, and it is well to note that in nearly every case it was possible to take fairly exact observations. The instruments at the disposal of the assessors could take temperatures to a height of 1,460 deg. C.; the weights, momentum, and direction of fall were approximately calculated; the force of the different water-jets was taken from manometers, and the times by stop-watches. Directly after each test

was completed, there was again a careful examination of the exhibits, accompanied in some cases by entire dismantling of the objects, and even afterwards by analysis; and it was then that among the valuable technical results arrived at, some object lessons could be learnt as to the ways in which the over-ardent patentee tries to prove the value of his wares in anything but a fair way. Doors supposed to be of some patent fire-resisting material, and that alone, were found to have inlays of silicates of cotton; ceilings had inlays of asbestos where certain patent plasters were supposed to be alone withstanding the flames, &c. One competitor, whose exhibit was very properly lauded, but who was very prone to these makeshifts, had even to be "most seriously recommended" (so the report sarcastically puts it) to learn to have more confidence in his very excellent wares before offering them to the general public.

It would naturally lead us too far to describe the many exhibits and numerous experiments in full, and we can only refer to such as are likely to call for special attention, either, on the one side, for very satisfactory, or, on the other side, for unexpectedly unsatisfactory, results obtained. As these extreme results were for the most part obtained with exhibits intended for the safe division of separate risks, we shall limit our descriptions to this class of tests, leaving the trials with staircases, fire-proofing of columns, uprights, &c., for a future occasion, as some further experiments of this class are intended to be made later on.

Perhaps the most remarkable experiments with satisfactory results were those with a patent fire-resisting glass, shown by Messrs. Siemens, of Dresden. The assessors have found it to be most suitable for any skylight or window necessary in a division between separate risks, as it will resist heat of 1,300 deg. (C.) for half-an-hour and more, bearing all manner of shocks, the sudden changes of temperature spoken of, and other strains, without appreciable damage. This material may be safely expected to limit the extension of any ordinary fire during its first and most critical period. Great care must, however, be taken in fixing plates of the Siemens's glass, as it has a tendency to expansion or bending under certain circumstances when in iron frames, in which case openings are formed between

the glass and iron through which flames can pass. The maximum size of the plates is 80 centimetres by 120 metres, or, roughly, 2 ft. 7 in. by 3 ft. 3 in., the thickness varying according to the probable maximum pressure they have to resist.

The most interesting experiments with a negative result were those with a floor by the so-called "Isothermal" Company of Berlin:—Fig 1 shows a section through a

The distance between the girders was 83 centimetres, or 2 ft. 8 in., the span for the girders 5.80 metres, or about 16 ft. 4 in. The expression "thoroughly fireproof" was used in the criticism of the assessors; but this expression, as the late Herr Stude explains in the introduction to the report, should always be read "as fireproof as possible." The maximum resistance required of any so-called "fireproof" material should

temperature of 1,000 deg. C., had no noticeable effect on these floors. The plates in one or two cases showed slight cracks at right-angles to the bearers, without, however, decreasing the stability. The customary tests with shocks were tried without avail; streams of water from the fire-engines had no effect. Heavy weights were tried, a load of 10,370 kilogrammes on the square metre eventually breaking one of the plates. The



Fig. I

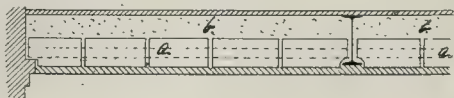


Fig. II

part of this floor; the girders alternately support the floor alone, or both flooring and ceiling; the flanges of the latter carry the half-inch magnesite plates (marked *a a*).—Concrete (see *b b*) is filled in between the girders; the ceiling below (*c c*) is of a similar mixture on wire-netting, whilst the floor proper (*d d*) is apparently of cement alone. This "Isothermal" floor has of course been advertised as indestructible, and many authorities have approved of it on account of the improbability of irregular expansion and the protection afforded to the concrete by the plates. A fire which burned forty minutes and had at no time a higher temperature than 1,000 deg. C. however made great havoc of the exhibit, to such an extent in fact that nothing but the girders, badly twisted, remained in position. The floor had not even been tested with falling weights, and when touched by a stream of water from below whilst in a heated condition, had not even resisted the ordinary water pressure used from a hydrant for extinguishing. Tried from above as to its waterproof qualities when the top surface was damaged, similar unsatisfactory results were obtained. This floor, which was constructed essentially of iron with non-conductors on a theoretically correct principle, only too plainly showed how very necessary a *bond-fide* test is for the *savant* who would rely on calculations alone, and is too prone to forget actualities. The girders, which covered a span of 6 metres, or 19 ft. 8 in., were only 50 centimetres, say, 19½ in. apart.

Another floor, also essentially of iron, with non-conductors, contrasted strangely with the "Isothermal" exhibit. This one was known as "Kleine's," and shown by Messrs. Wigankow, of Berlin. Figs. 2 and 3 give

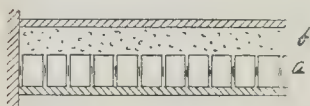


Fig. III

two sections through a part of this floor. The girders support both floor and ceiling. The flanges carry slabs (*a a*) made of a light Rhenish brick, cemented together and well tied with iron bands. The space between the girders is then filled up with slag (*b b*), the floor and ceiling proper being in cement. The assessors report this floor to be fire-resisting to a high degree. The fire which attacked it from below for three-quarters of an hour, showing temperatures of over 1,100 degs. C., did not affect it to any appreciable extent. It is true that the steam fire-engine which played on it from below brought down some pieces of the cement ceiling, which damage, however, in no way affected the resistance of the slabs. Shocks and weights up to 3,200 kilogrammes on the square metre were tried without effect, whereupon the cement on the floor was broken to try if the slabs were waterproof, and satisfactory results likewise obtained.

practically be that of one hour's duration against fire of an average temperature of 1,000 deg. C., with a maximum temperature of 1,500 deg. C. Such resistance is generally sufficient to allow for the extension of a fire from one risk to another being stopped by trained men with appliances, taking it for granted that the outbreak would not even be noticed until the average temperature mentioned had been operating some twenty minutes. The primary stages of the fire, the smouldering, &c., prior to a current of air fanning it, when a "light" would almost invariably be shown, should not affect a piece of "fireproof" construction to any appreciable extent. Not until the "light" is shown should the strain commence, and such a "light" is generally noticed in time to bring the first skilled assistance to the spot within half-an-hour of its first appearance.

A patent flooring by Messrs. Stolte was also spoken of by the assessors as thoroughly "fireproof." Messrs. Stolte are specialists in the preparation of various kinds of "cement plates." These they use for walls and doors as well as for floors. Their curved plates, which are made as light as possible for flooring, are illustrated in fig. 5. Figs. 6 and 7 show how they can be

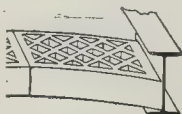


Fig. V

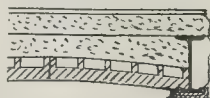


Fig. VI

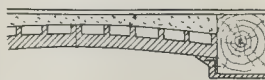


Fig. VII

carried both by joists as well as by girders. The curved plates are either 2 or 2½ in. thick. In fig. 6 they rest on the flanges of the girders, the lower faces of which are protected by small "cement boards" held in position by iron bands. In fig. 7 they rest on small L irons screwed on to the joists, the lower surfaces of which are protected by cement work. In both cases the space between the girders or joists is filled with sand, and an ordinary board flooring used. Fires of one hour's duration, with an average

distance of the girders from one another is, unfortunately, not stated, but may be taken approximately at 80 centimetres, or about 31½ inches.

Messrs. Mack, of Ludwigsburg, in Würtemberg, who have a good repute for their excellent "gypsum boards," exhibited several floors which, according to the assessors, could likewise be termed "thoroughly fireproof," but were unfortunately somewhat susceptible to any contact with streams of water from below. Figs. 8 and 9 explain the

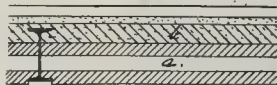


Fig. VIII.



Fig. IX.

construction of the "girder" floor tested. The flanges of the girders (which are 83 centimetres, or 2 ft. 8 in., apart, and have a span of 5.80 metres, or about 19 ft.) carry the plates (*a a*); the space between the girders is then filled up with a light "pumice" concrete (*b b*), the floor proper being rendered in Portland cement. The ceiling proper is of ordinary mortar work, the lower face of the girders, which it covers, however, being first prepared with wire netting. The numerous shocks, and other trials which the floor had to undergo during the forty minutes a fire of an average temperature of 1,100 deg. C. raged below, had no effect; weights of 1,000 kilogrammes were tried with little result, but a jet from the steam fire-engine easily knocked off part of the lower surface. The plates are supposed to contain as large a percentage of cork as of gypsum, bamboo, rods and hair keeping the various materials together.

Whilst Messrs. Stolte's, Messrs. Mack's, and the "Kleine" exhibits described are classified as *bond-fide* composite floorings, the "Monier" floor, of which fig. 10 shows a

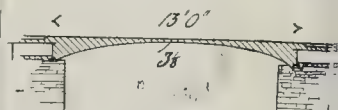


Fig. X.

section, is generally classed with the concrete arches, although it is also essentially a composite construction—i.e., a combination of cement with a framework of wrought-iron

bars of about $\frac{1}{4}$ in. in diameter, and mostly supported by girders. The dimensions of this "Monier" exhibit, which had been put before the assessors by Messrs. Waysz & Co., of Berlin, are marked on the illustration. The series of tests to which the "Isothermal" and other floors had been subjected were repeated, the average temperature in this case being again 1,000 deg. C., the loads on each square metre as much as 2,613 kilogrammes. No appreciable damage was done, and the assessors were able to express their confidence and entire satisfaction by reporting the exhibit to be "thoroughly fireproof." It would, perhaps, be well to remark that the report was not based on one experiment alone. As in all the cases described, there were several exhibits, but, as before said, space prevents taking notice of any but the most important ones.

The composite floors described were practically all intended to be used with iron girders, although fig. 7 showed how a joist could in one case be substituted. The two following floors (see figs. 11, 12, and 13) are now

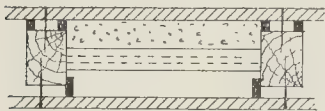


Fig. XI

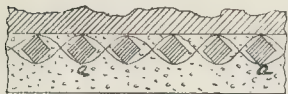


Fig. XII

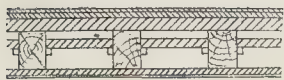


Fig. XIII

essentially such as are designed for joists alone, and where no iron, but wood only, with non-conductors, is used.

The floor illustrated in figs. 11 and 12 is protected from below by a very carefully-prepared combination of plaster and wood lathing, the former a patent composition, the latter well interlaced with wire to prevent any change of position. This lath and plaster work, if we may so call it, is kept some distance from the lower surface of the joists and pugging, the space between being well ventilated. The pugging (a fibrous plaster one, we believe) carries a layer of loam, and the floor proper above is of cement on lath-work, arranged similarly to that of the lower surface. The greatest pains were again taken to damage this floor, and a fire with an average temperature in this case of as much as 1,250 deg. to 1,300 deg. C. was kept up half-an-hour. The only noticeable effect, however, was the falling off in some few places of bits of plaster just below the extreme points of the lathing (a), the lower surfaces of which were then found to have been badly charred. At no point had the lath and plaster work been opened either by the fire or water so as to allow the flames to touch the joists or pugging; though in one or two instances slight cracks, probably occasioned by change of temperature, were visible. During the fire, among other tests, a succession of weights of 50 kilogrammes were dropped on to the floor from different heights, but no damage was caused by them except a breakage of the upper surface. Even when this surface

was broken, the floor also showed itself to be entirely waterproof from above—in fact, the exhibit in every way so thoroughly satisfied and astonished the assessors, that its success ranked next to the Siemens's glass we have spoken of above. Herr Schubert, of Breslau, is the maker of this floor, and the patentee of the lath and plaster work, which was also, by-the-by, tested with equally good results as a protection to walls, &c.

The floor shown in fig. 13 was exhibited by Messrs. Macks, of Ludwigsburg, whose "gilder-floor" we have already referred to. In this case the patentees used thin gypsum "boards" and plaster instead of the 4-in. hollow "plates." The joists, the surfaces of which had been well planed, were protected from below by $1\frac{1}{2}$ -in. "boards," the pugging was of 2-in. "boards," the space in between being well ventilated, and the floor proper of $2\frac{1}{2}$ -in. "boards," with 1 in. of a patent plaster above. The boards are comparatively light, and their composition is supposed to be somewhat similar to Wilkinson's fibrous slabs. In this case the fire lasted one hour, the mean temperature being 1,100 deg. C. The result was that the whole of the lower surface, i.e., the thin boards which formed the ceiling proper, had fallen down, the heat having caused the primary damage and weakened the holding power of the joists, and a stream of water having brought about the actual collapse. The joists were severely burnt, but not to such an extent as to let the well-weighted floor give way. The pugging had offered resistance, and the fire had not been able to pass to the risk above. According to the assessors, this floor, though badly damaged, would still be practically classed with the "fireproof" ones. It had offered resistance for an hour, and taking it for granted that substantial joists were used, there was no reason to believe that the system, with its well-laid pugging and flooring, would give way under the strains that it would be reasonable to expect this class of flooring to withstand. The susceptibility of the Macks' exhibits to water-damage was, however, again much remarked upon.

Walls, floors, and the protection of the necessary openings in them are the parts of a building which have to be considered most in the selection of fire-resisting materials. A "fire-proof" staircase, however safe, will be useless if smoke enter it from an unprotected opening. In cases like the warehouses of St. Mary Axe, which have lately been destroyed, the use of strong walls is general on account of the loads they have to support; good planning, with a careful division of risks, can then render a block practically safe if only the right material be chosen. The experiments with floors described above should aid the selection of horizontal divisions, as there were a number of positive results, and the Siemens glass is a good example of the materials suitable for the protection of window-openings and sky-lights, without using the make-shift shutters which generally remain unclosed through sheer negligence. As regards the protection of door-openings, the Berlin tests can, however, scarcely be said to have been as instructive as we should have wished, excepting in a negative sense; as there were several interesting cases of substantial-looking constructions not coming up to the assessors' expectations. An ideal "fire-proof" door (which would, however, probably also be left open as often as the less reliable one) should, like a floor, resist a fire of 1,000 deg. C. at least one hour, withstanding sudden strains up to 1,500 deg. C. It should then be absolutely smoke-proof, and not be ever affected to such an extent as to be immovable when in a heated condition. The greatest fault for a door would be its susceptibility to bending out of shape, as the slightest twist allows smoke and flames to pass through the opening.

A door by Messrs. Schubert, the body of which was of wood with a light iron framing, though "fireproof," was quite impracticable on account of its inconvenient weight. The wood was protected first by a layer of

earth, then by a layer of asbestos, on this some wire netting which held a thick layer of cement work. The door, which was 6 in. thick, measured about 3 ft. by 6 ft. It had to withstand a fire of 1,000 deg. C. for an hour and a-half. A second door by the same firm was of magnesite plates of 1 in. thickness. The magnesite was visibly affected by the same test, and bent to such an extent that the room it was to protect was soon filled with smoke, and caught fire.

Another door, by Messrs. Violet, of Berlin, of which much was expected, was likewise a failure. Fig. 14 illustrates this door, which



Fig. XIV

shows an iron frame (a) with a double layer of boards (b), protected by iron plates (c). The iron plates, expanding, bent outwards, leaving the wood unprotected. The door almost at once showed itself to be anything but smoke-proof, and after about half-an-hour's fire of 1,000 deg. the flames burst through it. Strange to say the frame neither bent nor jammed and if the rims of the plates had been better protected, and some non-conductor placed behind them, better results would no doubt have been obtained. The door measured 76 centimetres by 1.86 metres, or 30 in. by about 6 ft., and was about $1\frac{1}{2}$ in. thick.

Messrs. Huber & Co., of Breslau, exhibited a door measuring 90 centimetres by 1.90 metres, or 35½ in. by about 6 ft. It had a thickness of about 1½ in., and as in the case of Messrs. Violet's door, was unfortunately fixed in a L iron wall-frame. Fig. 15 explains the

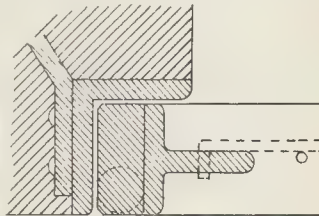


Fig. XV

construction, the part between the T irons being "Monier" work (a), i.e., cement on framework of $\frac{1}{2}$ -in. iron bars (b). The Monier surface withstood a fire of 1,100 deg. C. splendidly for forty minutes, but the door as a whole bent badly, smoke almost immediately entering the room, and the flames soon having a free passage into it.

Uncertain results were obtained from some doors shown by Herr Kühlewein, of Berlin. These, the largest exhibited, were not let into rebates in the openings, but simply covered them. They consisted of light iron framework held together by metal bands and covered on both sides by "asbestos cement" slabs. Here one door after forty minutes at 1,000 deg. C. bent, whilst another gave ample protection for one hour against a fire of 900 deg. C. Similar doors are to be tried again, as there was apparently some flaw in the hanging of the faulty one. Their dimensions were 42 in. by 6 ft., and the thickness 1½ in.

The only door, in fact, that received the assessors' approval was one of remarkably simple construction, exhibited by the Berlin Fire Brigade. Its body was of double oak boards nailed at right-angles to one another, well covered in with sheet iron, the ends of which overlapped and were nailed down. This door (like those of Messrs. Kühlewein) was hung not *in* but *over* the opening, being some 6 in. larger than the latter in each

direction. The fire to which it was subjected had a mean temperature of 1,000 deg. C., and a duration of some seventy minutes. The door showed itself to be thoroughly fire and smoke proof, but on being examined the wood was found to be badly charred. A thin layer of some non-conductor would have probably remedied this failing, but as the firemen exhibiting had limited their contributions to "everyday" constructions, the use of such a material was not permissible.

The report of the assessors gives no information as to the cost of the exhibits, as the promoters wished to avoid anything that would tend to let a commercial feeling show itself in connexion with the tests. This omission is, of course, in one sense an unfortunate one, as opinions as to the practical utility of the materials would be partially dependent on such information. For all this the experiments alone will have been invaluable to many, and even if the commercial element may have been rather too conscientiously avoided, the efforts of the promoters and the assessors should be fully appreciated. For once we have not had to deal with the tests of a tradesman advertising his wares, but with a *bona-fide* investigation in the interests of science alone.

COMPETITION DESIGNS FOR THE OPÉRA COMIQUE, PARIS.

AS we have already mentioned, the eighty-four designs sent in for the rebuilding of the Opéra Comique have been exhibited at the Palais de l'Industrie. The jurors appointed to decide on the merits of the various designs gave their decision last week. They have awarded the first premium, of 10,000 francs, to M. Bernier, who will therefore be commissioned to carry out the building. The second premium, 6,000 francs, has been awarded to MM. Larche and Nachon, and the third, of 4,000 francs, to M. Blondel. M. Gaspard André (of Lyons), MM. Duvert and Charpentier, M. Esquié, M. Adrien Chancel, and M. Dupuis, have each been awarded a premium of 2,000 francs.

It is impossible for us to go in detail into the merits of the immense number of drawings in which the eighty-four designs are exhibited; and we must confine ourselves to a few words on the designs most worthy of attention.

That of M. Bernier, which we presume will eventually come into actual existence as a building, is characterised by a classic severity of style and treatment. The principal façade, a little heavy in effect, presents on the ground floor three arched doorways flanked by two square-headed doorways at the sides; on the first floor stage are three large arched bays, the reveals decorated with bas-reliefs, framed within an order of Corinthian columns, over which, in the attic, are groups of sculptured figures. The side elevations show the same simplicity, the same correctness, and we might add the same coldness and formality of design. What has given this design its place in the competition is no doubt the technical portion of the drawings, which give evidence of very careful study, and the excellent arrangement of the plan in regard to entrances and exits. The corridors and rooms for the artists have also received very careful attention in regard to planning and arrangement. But M. Bernier seems to have made one mistake in not providing behind the scenes an independent passage connecting the two sides of the house. The possibility of passage exists, no doubt, but only across the stage itself, and in case of a panic there might be a fresh disaster to a crowd entangled amid scenery, "practicable" erections, and all the other inflammable adjuncts of a stage in working order. With that exception M. Bernier's plan is excellent, and he has shown great ability in making the most of the rather small area allowed for the site.

The same severity of style is seen in the

façade by MM. Larche and Nachon. Here again the jurors have evidently laid the principal stress on the interior arrangements, and perhaps with reason, since it is above all things desirable that the possibility of such a catastrophe as that which accompanied the destruction of the former house should be reduced to a minimum. One might, however, have reasonably demanded a somewhat less dull and commonplace architectural treatment. The great defect of the whole competition is the almost entire lack of originality of conception, and it would seem as if nearly all the competitors had set before them as a model the classic type of theatre which was in fashion under the second Empire, such as the theatre at the Place du Château, or the "Gaité" and "Vaudeville."

M. Blondel, the third in the race, has, however, evidently been haunted by reminiscences of the Opéra House. His design is sufficiently decorative in effect, and has more life and interest in it than the two first-named, and the plan is cleverly arranged. The design by MM. Duvert and Charpentier, for which the Department of "Bâtiments Civils" evinced a great predilection, is certainly little worthy the credit awarded to it, and we much prefer the design by M. Gaspard André of Lyons. His elliptically-planned façade, with a loggia on the first floor stage behind an order of Ionic columns, is very attractive in appearance and excites a good deal of attention.

M. Esquié has submitted a design which is very poor in regard to plan and general arrangement, but of great originality in regard to architectural design. The principal façade shows a large arch springing from coupled pilasters, beneath which are seen, in deep shadow, large circular-headed arches surmounted by a fan-shaped tracery window. The balconies of the first floor are supported by caryatides, and the angles are adorned by large winged figures, with harp and violoncello respectively. The whole is crowned by a rounded cupola which, with its profusion of sculptured accessories, looks rather like an Indian pagoda. The design has at least the merit of offering a vigorous contrast to the architectural commonplace of its neighbours, while it has not so much of the appearance of a provincial theatre façade.

The elevation by M. Adrien Chancel is much more simple in style, but of fine character of design. The large staircases are a fine feature of the design, but the foyer, on the other hand, is rather cramped in proportions. Two covered carriage porches are provided; and on the whole the principal façade is one of the best in the set, and might have claimed a better place in the competition.

In addition to the special premiums, honourable mentions have been awarded to the designs by MM. Ballu, C. Bernard, Cousin, Blavette, Bréasson and Camut, Breffendille, Brumeau, Courtois - Suffit, Dauphin, Delestre, Richard, Gervais (the architect of the Théâtre des Arts at Bordeaux), Gerault, Henry and Massa, Leclerc, Mayeux, Morice, Paulin, Gray and Bossis, Pujol, Raulin, Ruy and Loison, Schmit, Tronchet, and Rey. We have not space to say anything special of these, and most of them do not present anything of much interest. We may mention, as showing some originality, the gay-looking façade by M. Raulin, with its loggia painted in red in the Pompeian style, which opens on a large balcony ornamented with faience and tiled panels, with light blue columns accompanied by sculpture also in polychromy; a very good design for a casino at a watering place.

In the main, in spite of the number of talented architects among the competitors, the competition has not brought to light many new ideas or contributed much to the progress of theatre architecture. It would appear also that many of the competitors are but little acquainted with the official regulations in regard to French theatres, and have not taken the trouble to consult experts who

could have furnished them with important hints in regard to the arrangement of the various departments in the interior of the house. It must be added that the competition has taken place under very unfavourable circumstances, owing to the unfortunate parsimony of the Government, which has refused the three million francs necessary to purchase the expropriation of the houses lining the Boulevard des Italiens. The new theatre will therefore, like the old one, be surrounded by narrow streets and private properties, with the stage portion backed by house property in close contiguity to it, a situation which creates an extra risk both to the theatre and to the adjoining property. It would have been far better to have built the theatre so as to present a full front towards the boulevard, which would have been an ornament to the street and at the same time have allowed of greater space being devoted to the plan, and of arranging the interior in such a manner as to afford both a more convenient plan and a better guarantee of safety to the public.

M. Louis Bernier, the architect whose design has been selected, is a native of Paris, and a pupil of M. Daumet, the well-known architect. He obtained the Prix de Rome in 1872, the Cross of the Legion of Honour in 1889, and a gold medal at the great exhibition of that year. It was he who designed the pedestal for the statue of Bayre, which is to be inaugurated next year on the Île Saint Louis.

NOTES.

THE discussion in the House of Lords last week upon the views of the Education Department in regard to forcing Elementary Schools up to a more advanced standard of perfection in regard to structures, ventilation, and sanitation, was not very creditable to some of the members of the Upper House. In January last a circular was issued to the Inspectors, asking them to give their attention to the above matters. Lord Harrowby, and some other Peers, consider the issue of this circular and the intention of the Education Department to bring Elementary Schools to a better state in regard to these matters as an attack on the voluntary system. We are not concerned here with the merits or demerits of either the Voluntary or the Board School systems; but it is certain that if the managers of voluntary schools try to shirk their responsibilities in regard to the school structures under the plea that the Department is attacking the voluntary system, they will not obtain sympathy from any intelligent person. It is most desirable that the elementary schools of the country, whether supported by voluntary contributions or by rates, should be thoroughly healthy—in other words, that they should be well built, well lighted and well ventilated, and that their sanitary state should be up to the level of modern requirements. There is no doubt that many of the elementary schools are not up to the mark in this respect; and if the advocates of the voluntary system desire to retain the confidence of the community they should embrace the present opportunity. Where schools are in good condition the managers can take credit for this; where reforms are needed they can show that they appreciate their responsibilities by undertaking improvements without delay. To endeavour to stave off sanitary reforms on the ground that voluntary schools cannot find the money to undertake them, is neither more nor less than a confession of incapacity.

THE sixth annual meeting of the National Association for the Promotion of Technical and Secondary Education, which was held this week, was of a congratulatory character. There is no doubt that technical education has made a fair start in this country, and that this Association, by con-

tinuing to give advice and information as to the best methods of using the money at the disposal of local authorities, is doing most valuable service to the country. To a large extent the County Councils and similar bodies are working tentatively and in the dark; but it is satisfactory to find that some County Councils have sent their organising secretaries to the Continent to collect information. For the present it is most important that they should avoid mere hobbies, and spend their money cautiously. It was naturally, also, a matter of congratulation that the London County Council had at length taken up the subject of technical education, and we are glad to see that the work of the City Companies, who have been in advance of the time on this subject, received merited praise. The Duke of Devonshire, who presided on this occasion, suggested that valuable information could be obtained were another Royal Commission appointed to take up the inquiries on this subject from the date when the Royal Commission appointed in 1881 made its report. We confess that at present it is doubtful if the appointment of such a commission would be desirable; this National Association can give much information, and the present need is chiefly for organising the existing force; the Executive Committee could probably advise any County Council satisfactorily as to the best way to employ the money in its hands.

THE lack of unanimity with regard to the coal trade crisis has become more apparent since last week, both among masters and men. A comparatively large number of miners in the Federation districts are still without notice from their employers, and they are not all inclined to cease work of their own accord. Northumberland and Durham are entirely averse to this course—which is not surprising, as, if they hold aloof, the result will be the restarting of many collieries that have continued idle since the last strike. The Durham men have to say yes or no on the question of asking for an advance of 15 per cent., and also as to whether they will join the Miners' Federation in their strike against the 25 per cent. reduction. It is a significant fact that the Executive Committee of the Durham Miners' Federation have declared the success of a general strike, in their opinion, to be impossible; remarking, in a circular addressed to their members, that "we should not be doing our duty if we did not plainly tell you the consequences, and urge upon you not to be drawn into this dispute, except to give what support you can to those who may be in it." Of course the "support" desired by the Federation is that everybody connected with coal mining and coal carrying should cease work simultaneously. In all probability the two northern counties, at least, will decline to do so; and it would therefore appear that this district, if it does not exactly hold the key of the situation, will largely determine the course of events. In the meantime the consumer, as usual, is already being drawn upon to pay the piper.

THE debate in the House of Lords on Tuesday in regard to the betterment clause in the Bill of the London County Council as to, among others, the Tower Bridge improvement, was unsatisfactory. Lord Onslow and the Duke of Argyll introduced a good many irrelevant questions, in which some Peers considered that they were voting for or against the betterment principle; others considered that the question in the present case was too small to be worth real opposition. On the whole the feeling was not averse to betterment as a principle if fairly carried out, and it was certainly felt that to reject the entire Bill because it dealt with betterment in regard to one improvement on a minute scale would not be satisfactory. The question cannot be set finally at rest until the principle has been discussed in Parliament free from particular considerations.

A SPLENDID collection of the late Gottfried Semper's drawings, numbering some twelve hundred sheets, has just been presented to the Saxon Royal Academy by the son of the eminent architect, Herr Manfred Semper; and the authorities of this institution have decided to give the valuable gift a separate hall in their new home on the Bruehlsche Terrace. The drawings include Semper's original sketches for nearly every building he carried out, in many cases accompanied by such working drawings as he made himself, and other fine drawings illustrating designs not carried out, such as one for the proposed Munich Opera House, the Rio Janeiro Opera House, &c.; and some four hundred measured drawings, taken when travelling in Greece and Italy from 1831 to 1833. The collection has been most carefully arranged, and thirty-seven divisions have been made to assist the classification of the drawings. Semper, it will be remembered, died in 1879, and soon after his death his son commenced a publication of his drawings, which had, however, to be broken off at an early stage from financial and other reasons. In presenting the collection to the Saxon Academy, Herr Manfred Semper, however, reserves to himself the right of continuing their publication, which we hope may some day be completed. We hear that Zurich has also come in for some of Semper's drawings, a collection of some four hundred and fifty having been presented to the Semper Museum in that city. These drawings mostly relate to such work as he carried out during his stay in Switzerland from 1855 to 1870, and to the college work and studies he did as a Professor in the Zurich Technical College.

THE annual exhibition of works of students in competition for the prizes in the various schools of art has been held during the past week at the South Kensington Museum. As a temporary building had already been erected for other purposes in the court-yard of the Museum, the various drawings, designs, and models have been placed there, much to the advantage of the drawings themselves and to those who go to see them. Whether, owing to the greater space or not, the present exhibition conveys the impression of greater size than usual, and there is some very excellent work in all the departments represented. In the Architectural section are a large number of measured drawings from old work. Alfred J. Dunn (Birmingham) sends carefully-measured work illustrating portions of the cloisters at Gloucester Cathedral, a bay of the lavatory arcade, a bay of the north wall, and the doorway in the west walk, with plans showing the vaulting, sections, and details—altogether an interesting set. Ralph W. Bedingfield (Leicester) submits a set of drawings in brown ink, a trifle weak in execution, of the organ screen at King's College Chapel, Cambridge. A highly interesting set of drawings of the Roman Villa at Brading, discovered a few years back, with careful details of the mosaic pavements, is by Hy. C. Wallis (Ryde, I.W.), and has been awarded a silver medal. Amongst others of interest are South front of Hall in the Wood, Bolton-le-Moors, Lancashire (Joseph Knight); Ye Olde Oake House, West Bromwich, elevations, plan, and perspective (Wm. C. Green); a set of drawings illustrating the interesting church of Kilpeck, Herefordshire, by John Pocock (Hereford), with details of the fine south porch and chancel arch, Warkworth Church, near Banbury (John E. Thorpe), a small church of the Decorated period; the church of St. Giles, Sandiacre, Derbyshire, showing a fine Decorated chancel, but the drawing rather spoiled by the blacking-in of the windows (Lawrence W. Bright); a chimney-piece in Bablake's School, Coventry (Joseph H. Poole); the Church of St. Mary, Dalton-in-Furness, elevations, plans, and sections (Robert P. Nelson), and some good good bits of wrought ironwork from

Warwickshire, including fine gates from St. John's Hospital, Warwick (by James A. Swan). The architectural designs are not so uniformly good. By far the most original in design is a study of a church (Jas. H. Tonge, York), which has some very picturesque features, and seems to have been well thought out. Amongst the drawings is one showing a simple altar, and a typical reredos over. This set has been awarded a gold medal. There is a fair design for a tennis pavilion (by John E. Thorpe), but the other designs, which cover a great many subjects, from a Cathedral to a country post office, are not of much merit either as regards design or draughtsmanship. Some effective ironwork design is submitted by Sydney Newton (Leicester), and Wm. Feen (New Cross), the latter also having an effective design for a mosaic floor and a hall lantern and lock plate. Amongst the decorative designs, ladies have been largely successful. Very clever designs for mosaic pavements are shown by Mary Caldwell (Canterbury), Evelyn D. Foster (Hertford), Charlotte Trower (Hertford), and Gertrude Roots (Canterbury). Two designs for linoleum or floorcloth by Fred. W. Gregory and Fred. Appleyard, and a design for a majolica plaque by Horace E. Drake, are worthy of notice. Also two designs for pottery by Wm. Hindley (South Kensington), and a full-size detail of a wallpaper in two shades of blue by Clara E. Byrd (Birmingham). Book decoration designs are shown by Sydney Heath and Georgie E. France, the latter including some delicately drawn menus, invitation cards, &c. Among book illustrations are excellent examples of penwork by Alfred Jones (Manchester), being illustrations for "The Travelling Companion" by Hans Andersen, and "A Combat" by Robert Spence (Newcastle-on-Tyne.)

THE last number of the "R.I.B.A. Journal" contains extracts, at considerable length, from the report on working-class dwellings in France, made by Mr. Locke Worthington as holder of the Godwin Bursary. It is accompanied by several plans of recent French buildings of this class. The investigation summarised in Mr. Worthington's report must have cost a great deal of time and labour, and appears to have been very thoroughly and conscientiously gone into. The French, however, have only very recently taken up this subject seriously, and from the plans given in the Journal it would hardly appear that we have anything to learn from them in reference to plan and arrangement. The system of having w.c.'s opening direct out of living-room, kitchen, or scullery, which we observe in the buildings erected by the Société Philanthropique from the designs of their architect, M. Chabrol, is to English notions most objectionable in regard both to decency and sanitary considerations. The former is a matter depending, no doubt, on the varying views and habits of different populations, and everyone knows that in this respect French ideas, even among the upper classes, are by no means so delicate as English; but sanitary principles are of universal application, and what is bad in London in this respect is equally bad in Paris. In the plan of the working-class dwellings at Rouen, erected by the "Société Anonyme des Petits Logements" (M. Lecœur, architect) the closets are arranged either off the staircases and entries (in a much too public manner in regard to access) or out of small yards at the backs of some of the houses; these latter are satisfactory as regards method of access, but their doors are close to the windows of some of the ground floor living-rooms. The most practically interesting passage in the report, for English readers, refers not to construction, but to the system of providing for freehold houses carried out by some of the societies mentioned, which "act on the principle that it is not sufficient to provide that the workman should have an agreeable and healthy home, but that it is desirable to

so arrange building operations that he shall have a secure holding and shall eventually become the proprietor." A society called "Le Cottage," at Oullins, near Lyons, has for its object the providing of small houses for sale to workmen. The principle is to construct "to order"; it is therefore known in advance who will be the occupier and intending purchaser, and the latter may have such modifications in the standing type of plan as suit his personal tastes. The rents are arranged so that the property is acquired by the tenant at the end of fifteen years. The shareholders are debarred by the rules of the society from receiving more than 5 per cent. dividends. We are not told, however, how much they actually do receive as a rule, which it would be useful to know. Any provision by which the tenant of such a house can eventually become its owner is a most valuable one in a social sense, as giving the working man a more direct interest in his home. Mr. Worthington's report and the plans, twenty-seven in number, which accompany it, are to be preserved in the Institute library.

AT the present crisis in the career of Drury-lane Theatre we shall not, perhaps, do amiss in giving a short note as to its history. In the early years of the seventeenth century the cockpit in Drury-lane was converted into the Phoenix Theatre, and there, in 1629, was performed "The Wedding," by Shirley. The theatre, after having been twice sacked by the apprentices, was pulled down by a party of fanatical soldiers in 1649. At the Restoration Rhodes, a bookseller, rebuilt the house, and there Sir W. Davenant and his company, which included Betterton and Kynaston, performed until their migration to the "Duke's" in Portugal-street in 1662. This theatre's site became Cockpit-alley (since Pitt-place), Orange-court, Wild-passage, and Stewart's-tenants—all demolished twelve years ago for the Peabody Dwellings standing along the north side of Kemble, formerly Prince's, street. On Thursday in Easter-week, March 8, 1663, Killigrew opened the "King's House" with Beaumont and Fletcher's "Humorous Lieutenant," performed at three o'clock. This is the "King's House" in the Riding-yard, measuring 112 by 59 ft. on plan, so familiar to readers of Peeps. The patent to Killigrew does not restrict the choice of site beyond its being "assigned and allotted out by our surveyor of works"; nor has it been regarded as attaching to a particular site. But the site has remained unchanged to this day between Vinegar-yard and Russell-street. In January, 1671-2, a fire destroyed the "King's House"; it was rebuilt by Sir Christopher Wren, and opened on March 26, 1674, with a prologue and an epilogue by Dryden, who had joined with Killigrew, Hart, Mohun, and others, in the new venture, known also for a while as the "Covent Garden" Theatre. Rich, Steele, Dogget, Wilks, Cibber, and Booth were, in turn, patentees. On Sept. 15, 1747, Garrick opened it with Johnson's well-known prologue to "The Merchant of Venice," and there on June 10, 1776, he took leave of the stage, playing the part of Don Felix in "The Wonder." Mrs. Siddons first appeared here in 1755. John Kemble's management began in 1788. Three years later the old theatre, which had been refaced by the Adams, and stood behind the Rose and Windmill taverns in what was Brydges-street, was pulled down and rebuilt, on an extended scale, by Holland, with a capacity for nearly 4,000. This is the house that was burnt down in the night of February 24, 1809. The present house was designed by Benjamin Wyatt, on the plan, it is said, of the theatre at Bordeaux, and was opened on October 10, 1812, with Lord Byron's prologue. In 1818 the theatre was let for 10,200*l.* per annum to Elliston, for whom Beazley curtailed the auditorium, and added the cast-iron colonnade in Russell-street, and the portico in Catherine- (formerly Brydges) street, which is surmounted with a leaden figure of

Shakspeare. This is the theatre associated with the career and compositions of Balfe. The pit door of the old house remained, until a few years ago, in Cross-court. Here Edmund Kean made his first entry in 1814, and on February 26, 1851, Macready finally retired. The existing ground lease will fall in at Christmastide next year, and the Duke of Bedford has informed the renters that he is unwilling to renew it. We believe that the lessee now pays 6,000*l.* a year, augmented by 10*l.* for each performance after the first 200. A year's rent of 1,365*l.* is paid to the Duke, and 3,100*l.* goes to the new renters' trustees. Drury-lane, as a playhouse, is, as also is Covent Garden free from the Lord Chamberlain's jurisdiction, and has been so since 1837, when Bunn declined to renew the hitherto customary licences of about twenty-one years each, on the ground that he represented the "heirs and assigns" of the original patent, of April 25, 1662, to Killigrew. Whether the patent is still alive, and whether it will go to the new theatre (if there be one), are two legal points which will possibly, by-and-bye, come up for decision. Upwards of 218,000*l.* is said to have been spent upon the house, which is uninsured.

THE ROYAL ARCHEOLOGICAL INSTITUTE AT SILCHESTER.

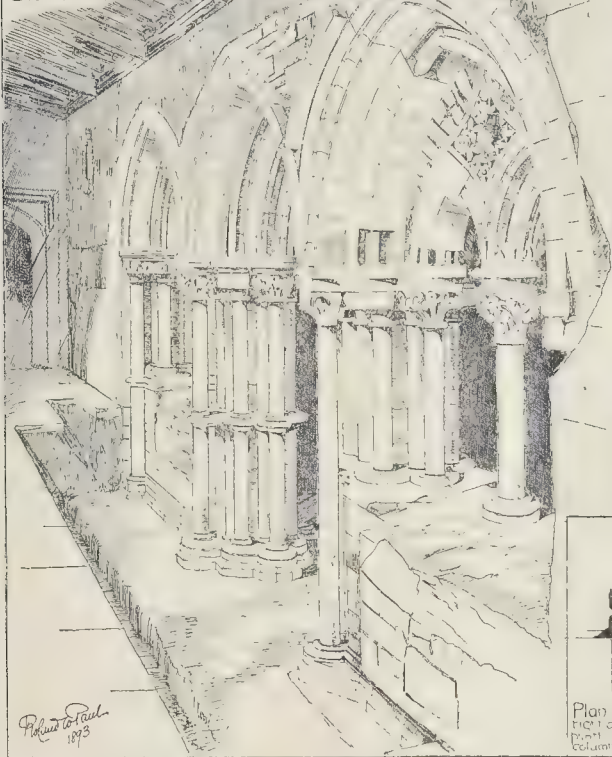
ON Thursday, July 20, a considerable contingent of the members of the Royal Archaeological Institute who had been attending the London congress tarried for an extra day in order to visit Silchester and the excavations now in progress. A saloon carriage conveyed the party, about thirty in number, from Paddington to Reading. At Reading a considerable time was spent in the museum, which has been specially fitted up and considerably enlarged in order to receive (with the consent of the Duke of Wellington and the Society of Antiquaries) all the Silchester discoveries, which are deposited there at the end of each season. A small room is set apart for the important architectural fragments, and for the various models of different parts that have been so carefully prepared by Messrs. Hope and Fox. Against the wall hangs a large plan of the city, upon which are marked to scale the various discoveries and ground-plans as they are uncovered. We would suggest that the date should be clearly marked as each addition is put upon the plan. In this room Mr. G. E. Fox, F.S.A. gave a comprehensive sketch of the history of Silchester, and conclusively showed the great importance of the systematic investigation now in progress, particularly in the bringing to light architectural details which tell far more of the life of England under the civilising sway of the Romans than do bits of pottery, bronze, or iron, for these, however valuable and interesting as details, can only speak incidentally of manners and customs. "We can judge," said Mr. Fox with epigrammatic truth, "far more of a man from the house in which he lives than from the tea-pot which he uses." Three models, all of them on the scale of $\frac{3}{8}$ inch to the foot, occupy the centre of the room, one being of the important west gate, another of a typical house of the smaller class, and the third that of the Christian church discovered last season, and which has recently been put in position. Round the walls are placed the great Corinthian capitals from the columns of the first basilica, a half capital of the Doric order found at the south gate, a tablet of Purbeck marble with the beginning of an inscription, the base of a column of the ambulatory of the former, and some smaller columns, which were either from colonnades of the former, or formed part of some ambitious architectural ornamenting of the larger houses. A piece of Roman roofing has been ingeniously reconstructed from squared stone shingles arranged in a diamond pattern. There are also various examples of roof tiling, of square blue tiles from hypocausts, of fragments of Purbeck and foreign marbles for wall lining, and of plaster painted in various shades and patterns. The small Mosaic centre of a pavement has also been moved here, and there are also several varieties of *opus signinum*, a hard concrete formed of various materials, the surface of which is ground level and polished for pavements.

In a much larger room is a wondrously varied collection of the detailed finds of the last three

seasons, including every variety of Roman pottery that is known, such as the black coloured ware intermixed with small grains of powdered flint, resembling the earlier Celtic pottery, every variety of Samian and pseudo-Samian, as well as vases and fragments from the Medway, Caistor, Salop, New Forest, and other English kilns. Objects of bronze, bone, glass, leather, and iron covered the walls and table-cases in endless variety. Of the remarkably large and diverse find of iron tools and instruments, the small hand anvils for driving into the ground, and hammering out thereon the scythes of the mower, attracted the most attention. These were discovered last year and excited much attention, and not a few more or less wild conjectures as to their use. But last winter it was ascertained that these small anvils, of almost identical pattern, are still being manufactured in Birmingham for use in southern Europe and in the Spanish settlements of South America. Colonel le Cornu remarked that they need not go so far afield for their use, as they were used at the present day on his estates in the Channel Islands by the French mowers who came over from Normandy and Brittany.

A drive of some ten miles brought the party to Silchester. Here the general condition of the great walled city, and the result and nature of the excavations were explained by Messrs. Fox, Jones, and Mill Stephenson, as many of the members of the Institute were making their first visit. There is no need, however, to reproduce in these columns, even in the briefest way, the remarks on the past excavations, whether of the great basilica and forum in the 'sixties and 'seventies, or of the more systematic work of the last two years. We will content ourselves with the work done during the first half of the season of 1893, which has not so far been in any way chronicled. Immediately to the south of the central insula containing the great civic buildings of the city is a circular building which was excavated by Mr. Joyce some twenty-five years ago, and was pronounced to be a temple. It has within it another circular wall or building, so that the outer wall inclosed a corridor or passage round the inner one. This arrangement of one building within another corresponds with the two square temples that were found near the east gate. This circular building has now been again exposed, and to a greater depth, and with greater care than was used in its first unearthing. It is to be carefully planned out and further examined. It seems likely that its probable use for Pagan worship or for a Pagan shrine will be confirmed; nothing corroborative of the theory that it may have been a Christian baptistery, which was first propounded by Professor Freeman, has as yet been discovered. Not far from this, on the south side of the city, considerable excavations have been made that cover the whole of one insula or square, and considerable parts of another. Much of this space, though closely intersected with trenches, has brought nothing to view save occasional finds of small objects and fragments. It has probably been garden ground, or else very thoroughly cleared for subsequent building purposes. In one angle however of the insula, a typical example of a house of the larger size has been uncovered throughout, and it presents so many characteristic features that Messrs. Fox and Hope have decided to reproduce it in half-inch model. A courtyard with corridors forms a centre round which the rooms are placed, and these again have a kind of external corridor broken up into smaller rooms. The hypocaust for the warming of the winter parlour is the best and most perfect of its kind that has yet been uncovered. The corridors are neatly paved with inch-square tesserae of red tile. Some of the rooms have had squares of mosaic patterns, whilst others are effectively floored with tesserae of a grey colour made from sandstone bordered with deep blue tesserae of overlaid tiles. The atrium, triclinium, and usual set of rooms can readily be distinguished. Several of the floors bear evidence of rude patching with large tiles and stones, which was probably done during the period when the city was sinking into gradual decay, as the Roman withdrawal became more and more imminent.

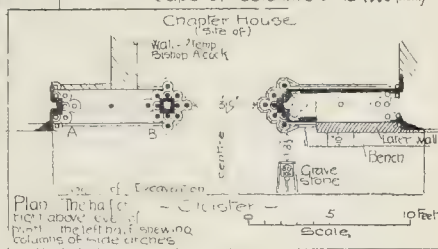
A good deal of sorrow was expressed by the visitors, who were not here last year, at the covering over with soil of the site of the small Christian church or basilica, upon the surface of which there is now a good crop of mangels; but it is the best way of keeping out the frost. Those who have closely studied the question, no longer have any doubt as to its being really a Christian

JESUS COLLEGE,
CAMBRIDGE.Recent discoveries
in the east
walk of the
Cloisters.

Caps of Columns at A (see plan)



Caps of Columns at B (see plan)



church, and speak with the utmost certainty. They have also much hope of finding one or two more churches within the area of the city before the work of excavation is finally accomplished.

A large variety of finds in pottery, glass, bone, bronze, &c., discovered in the last eight or nine weeks are now heaped up in the temporary wooden receptacle close to the present diggings. We noticed several vases of much elegance, some flue tiles with handsome and hitherto unnoticed patterns on the side that would be left exposed in the inner walls, and a fine example of a bronze finger ring, to which a folding key was attached. But the two most noteworthy finds are two large square Roman bricks or tiles. On the reverse on one of these is a rude but spirited drawing, done whilst the tile was yet soft by some "prentice hand, of a cow or ox, doubtless an example of the now extinct *bas loutier*; on the back of the other tile was some rude lettering, possibly mere alphabet practising, which must be left to Mr. Haverfield, or some like expert to unravel.

There have also been some slight excavations on the north side of the city, but so far with no special results. Tea in the Church Barn, near the east gate, brought a pleasant sunny day to a close.

NEW STREETS AND BUILDINGS BYE-LAWS AT CARDIFF.—A special meeting of the Cardiff Corporation Public Works Committee was held at the Town hall on the 17th inst. for the purpose of considering the draft of the revised bye-laws relating to new streets and buildings. Alderman Daniel Lewis (the deputy-mayor) presided, and there were also present Alderman Fulton, Mr. W. Harpur (Borough Engineer), Mr. Cornish (deputy-clerk), and others. The alterations in the bye-laws chiefly referred to alterations in the thickness of walls, scantlings, roof timbers, joists, and beams. The Committee, after carefully examining the draft, agreed that the Council be recommended to adopt the bye-laws as to the alteration of buildings, and forward the same to the Local Government Board for provisional approval.

DISCOVERIES AT JESUS COLLEGE,
CAMBRIDGE.

ADDITIONAL interest has been recently given to the already interesting group of buildings of Jesus College, Cambridge, by discoveries which have been made in the east wall of the cloister. The present chapel was originally the church of the Nunnery of St. Rhadegund, and is still largely composed of work of the Norman and Early English periods. The north transept is chiefly of the former style. Considerable alterations and additions were made by Alcock, Bishop of Ely, who transformed the nunnery into a collegiate establishment. To the north of the present transept is a passage, now leading to the new quadrangle of the college, and probably standing on the site of either a sacristy or slype. To the north of this are college-rooms in two stories, built by Alcock. It is in this portion of the east wall of the cloisters, between the passage and the north-east angle, that the discoveries have been made. Traces of carved work were found on removing the plaster from the wall at this point, and further search has led to the finding of three very beautiful Early English arches, which formed undoubtedly the entrance to the vestibule of the chapter house from the cloister. The arches are of equal span and height, the centre one being a doorway, the side ones subdivided by lesser arches into two lights with openings in the head. The mouldings of the arches are of three orders, very boldly treated. The arches rest on groups of clustered columns arranged round a pier 11 in. square (see plan), the shafts of the doorway being banded about midway between cap and base. The side arches are closed by dwarf walls at this level in the usual manner. Some of the caps have the usual conventional carving of the period. Others, again, are left plain, doubtless intentionally, to show off those that are carved. Two caps on the northern respond claim attention from the curious character of their carving, which

strongly resembles the classic egg and tongue ornament. Those facing them are also unusual (both these groups are shown in the sketches). The opening in the head of the southern arch, above the lesser arches, is elaborately ornamented with dog tooth and other ornaments. The corresponding opening on the north arch is simply moulded, with a row of small holes on the soffit, which seem to be original. The inner face of this wall has been treated in a similar manner, but the arches have had some of the outer order removed so as to form a smooth surface for the later room. The whole of this has not been cleared out, but sufficient remains to enable the width of the vestibule to be determined pretty accurately. It was about 21 ft. in width.

There are very distinct evidences in this fragment that it is not all of one date. Two materials have been used, clunch and Barnack stone. The whole of the arches, the carved portions of the caps, the square piers which the columns surround, and the dwarf walls of the side bays are of the former, while Barnack stone has been used for the abaci (the upper member only) the detached shafts, the bands, bases and plinth. One base, however, of the north respond is of clunch, and the group of bases of the south respond. These show very delicate mouldings, quite different in execution to the rougher work in the bases made of Barnack stone, which have evidently been inserted at a later period, possibly owing to the failure of the clunch to withstand the weight above it. The dwarf wall on the south side of the doorway is thickened a few inches, bringing it out to the present wall-face, and against this is a stone seat projecting 10 in. from the face of the wall. At first sight this fragment has an early appearance, and is in line with the Norman wall of the transept, which forms the wall of the present cloister south of the "slype" doorway. From the fact, however, that the plinth moulding of the Early English work is carried behind it, it seems obvious that this portion of the wall is a later addition, and may possibly have formed a buttress

to support this angle of the transept. The levels were considerably altered by Alcock. He raised the level of his cloister 3 ft., covered over this projecting seat, and would seem to have filled in the Early English arches with worked stone removed from their inner face, and rubble, in order to make a fair wall for his college rooms. How much of the Chapter House or its vestibule was standing at this time is uncertain, but for some reason the beautiful entrance, now discovered, was allowed to remain standing. About 20 in. west of the south column of the central arch is a monumental slab (see plan) with a cross on its upper side in relief. Only 2 ft. of it is at present visible, the rest being concealed by the present pavement. As it would be in the centre of the cloister walk, it is probably not in its original position.

The present discoveries were first made about Easter last, and since then the whole has been gradually uncovered. As large portions of the arch moulds had disappeared, these have been filled in with stone left in the block so as to give a proper support to the whole. It is much to be hoped that the excavations will be continued further. The sketch we give shows a general view of the arches, and the curious caps of the north arch. We also give a plan showing the old wall, and those of later date.

THE INSTITUTE EXAMINATIONS.

The following paper of advice to intending candidates for the Progressive Examinations of the Institute of Architects has been printed for the guidance of students who intend to pass these examinations. It may be useful to give it further publicity here:—

THE PROGRESSIVE EXAMINATIONS, R.I.B.A.

ADVICE TO CANDIDATES.

The Progressive Examinations are intended to afford guidance to students of Architecture in their professional studies, and opportunities for testing at well-marked intervals the progress made in their education, thus establishing a *minimum* standard of knowledge to be attained by all who intend to enter the profession, and to serve as a basis for further studies which are essential to the fuller development of architectural ability.

The Preliminary Examination for Probationer, R.I.B.A.—The subjects comprised in this Examination are those in which proficiency should be attained by the applicant before entering an architect's office, and it is desirable that special attention be given to them before he leaves school.

Clear and well-formed handwriting, correct spelling, grammar, and punctuation are indispensable.

Powers of observation and of graphic description, facility of composition and lucidity in the expression of ideas, should be carefully cultivated, as being of the utmost value in the prosecution of further studies, and in the work of later years.

Arithmetic, algebra, and plane geometry should be familiar to the candidate, and a knowledge of their application in the solution of simple problems in elementary mechanics and physics should be acquired.

The geography of Europe and the history of England from the Norman Conquest to the end of the Tudor dynasty should be well studied, regard being had to the connexion between the history of the country and its architecture.

A good knowledge of French is essential, and of German or Italian very desirable, and a clear understanding of the Continental metrical system will also be useful.

Geometrical drawing and the elements of perspective are indispensable subjects of study, and should receive particular attention; while freehand drawing with rapidity and precision from the cast and the antique, and sketching with accuracy, should be carefully cultivated. Reasonable proficiency in these subjects is of the first importance.

The Intermediate Examination for Probationer, R.I.B.A.—The first aim of the *Probationer* should be to acquire facility and accuracy in the geometrical and perspective drawing of architectural subjects, commencing with the Orders and the several periods of Medieval Architecture, drawn out to a large scale and from figured dimensions.

This course should be followed by careful study of the ornament appropriate to each style, the enrichments of the mouldings being drawn full size, and sketched and measured, as far as possible, from actual work.

A good general knowledge of mouldings and details having been thus acquired, their practical application should be maintained by the measurement of good examples of actual work, and by the making of fully figured and detailed drawings therefrom, with details full size.

The elementary principles of Classic and Medieval Architecture may be gleaned from the books mentioned in the Programme, but the *Probationer*

would do well to take advantage of every opportunity to consult the various other works set out in *The Calendar*.

The course of study necessitates the continuous use of a note-book (large number), in which the important parts of the books under study should be written down in the *Probationer's* own words, and freely illustrated by careful sketches from all available sources (notes on one page, sketches on the opposite page); and the subjects, being systematically arranged, might be further illustrated by notes and sketches from other books and authorities. A sketch note-book—to be freely and continually used—must be the inseparable companion of the *Probationer* wherever he may go.

The drawing of set subjects from memory is a most useful exercise, impressing on the mind the general proportions and harmony of the several parts of the details; the art of accurately sketching plans, elevations, sections, features, and details from memory should therefore be sedulously cultivated as proving of the greatest service, not only in the examinations, but afterwards in actual practice.

The study of the subjects comprised in the Science Section should be followed out in a similar manner, knowledge of details of construction being acquired, as far as possible, by actual measurement of work.

Applied physics, mensuration, land surveying, and levelling demand attention, with a view to the complete mastery of their elements and application; formulae for calculating the strength of beams, columns, &c., should be worked out and the results compared with actual experience; while particular care should be devoted to the study of practical geometry as applied to actual work, and to the acquisition of a thorough knowledge of the projection of solids and development of surfaces.

The Testimonies of Study must be carefully and clearly executed, with neat writing. The written memoranda must be prepared with care and neatness, and the illustrative sketches to be well and clearly drawn. The admission of the *Probationer* to the Intermediate Examination will depend on the satisfactory execution of these Testimonies; careless or imperfect work may lead to his exclusion.

The Final.—The principles of study recommended for the Intermediate apply equally to the Final Examination.

Reading to be of permanent value should be supplemented by the taking of copious notes, fully illustrated by careful sketches, and by the collection of information under various heads from different authorities. Combined with the study of the best accessible examples of old work, the habit of accurate sketching of architecture in plan, elevation, ornament, detail, and construction, especially from memory, should be assiduously cultivated, bringing eye, brain, and hand into common harmonious action.

When a knowledge of detail has been thoroughly acquired, the *Student* should take up the study of the general principles of design in both plan and elevation, and of the combination of parts to produce an effective and well-proportioned composition.

He should also master the principles and practice of the preparation of contract and working drawings and specifications, with the control of actual work, thus qualifying himself to deal with the ordinary and many of the difficult problems which arise in the designing and carrying out of modern buildings, and should miss no opportunity of visiting buildings in the course of erection.

As in the Intermediate, the admission of the *Student* to the Final Examination will depend on the sufficiency and excellence of the Testimonies of Study; poor composition, careless or imperfect execution leading to disqualification.

The books mentioned in the programme will supply the student with necessary information, but he is urged to take advantage of every opportunity to consult other standard works, the titles of which will be found in the *Calendar*.

The *Student* having passed the 'Final' should have acquired a solid groundwork of knowledge, on which he may proceed with those more advanced studies in design and construction, proficiency in which will qualify him to engage in successful practice as an architect.

Should the *Student* desire special advice, the chairman of the Board of Examiners will be glad to receive him by previous appointment, and render him assistance in the removal of his difficulties.

ARTHUR CALVERT,

9, Conduit-street, Hanover-square, London, W.
July 20, 1893."

ALL SAINTS' CHURCH, NORTH PECKHAM.—In reference to the list of tenders for this building, published in our issue for July 15, the architect, Mr. W. Planck, writes to us that Mr. Kinglerlee, one of the builders who tendered, claims that his reputation is somewhat suffering, as he appears to be by that list the lowest competitor and was not accepted. Mr. Planck writes to explain that the estimate was in three sections for this work, two only of which could possibly be accepted, and Messrs. J. Smith & Sons were the lowest on these, although Mr. Kinglerlee was the lowest on the whole three taken together.

BUILDERS' BENEVOLENT INSTITUTE: ANNUAL MEETING.

THE forty-sixth annual meeting of this Institution was held on Thursday, July 20, at the offices, No. 35, Southampton-row, Bloomsbury-square, W.C. Mr. Thomas Stirling occupied the chair.

Major Bruton (Secretary) read the report, in which the Committee expressed their regret that the expenditure had exceeded the income. This circumstance might have arisen from the increased anxieties which had of late been attendant on the building trade, or from the temporary falling-off in subscriptions to many charitable objects, and this Institution might have shared in the general depression. The Committee, however, appealed to the subscribers to increase their subscriptions, and asked them to do all in their power to enable the Institution to continue the good work it was doing, and not to permit its benefits to be curtailed. The want of entirely new subscribers to take the place of those removed by death, changes, and other causes, was greatly felt, and if such were obtained, they would be in the highest degree beneficial to the prosperity of the Institution. By reason of the diminution of income during the past year, the Committee had considered it advisable not to elect more than two pensioners in the place of the five who had died, although several applicants were anxiously waiting for their election. The Committee offered their grateful thanks to Mr. Joseph Randall for the able and zealous service he had rendered as President of the Institution during the past year. They also thanked the stewards and the honorary auditors for their labours in the welfare of the Institution. Mr. George H. Trollope, of the firm of Messrs. G. Trollope & Sons, had consented to be the President for the ensuing year, and would preside at the annual dinner, to be held on Thursday, November 23, in the Hall of the Worshipful Company of Carpenters.

The Chairman moved the adoption of the report, which was unanimously agreed to.

Cordial votes of thanks were passed to the President, Vice-Presidents, Trustees, Treasurer, Committee, and Auditors.

The Chairman then proposed that Mr. George H. Trollope be the President for the ensuing year. This was unanimously agreed to.

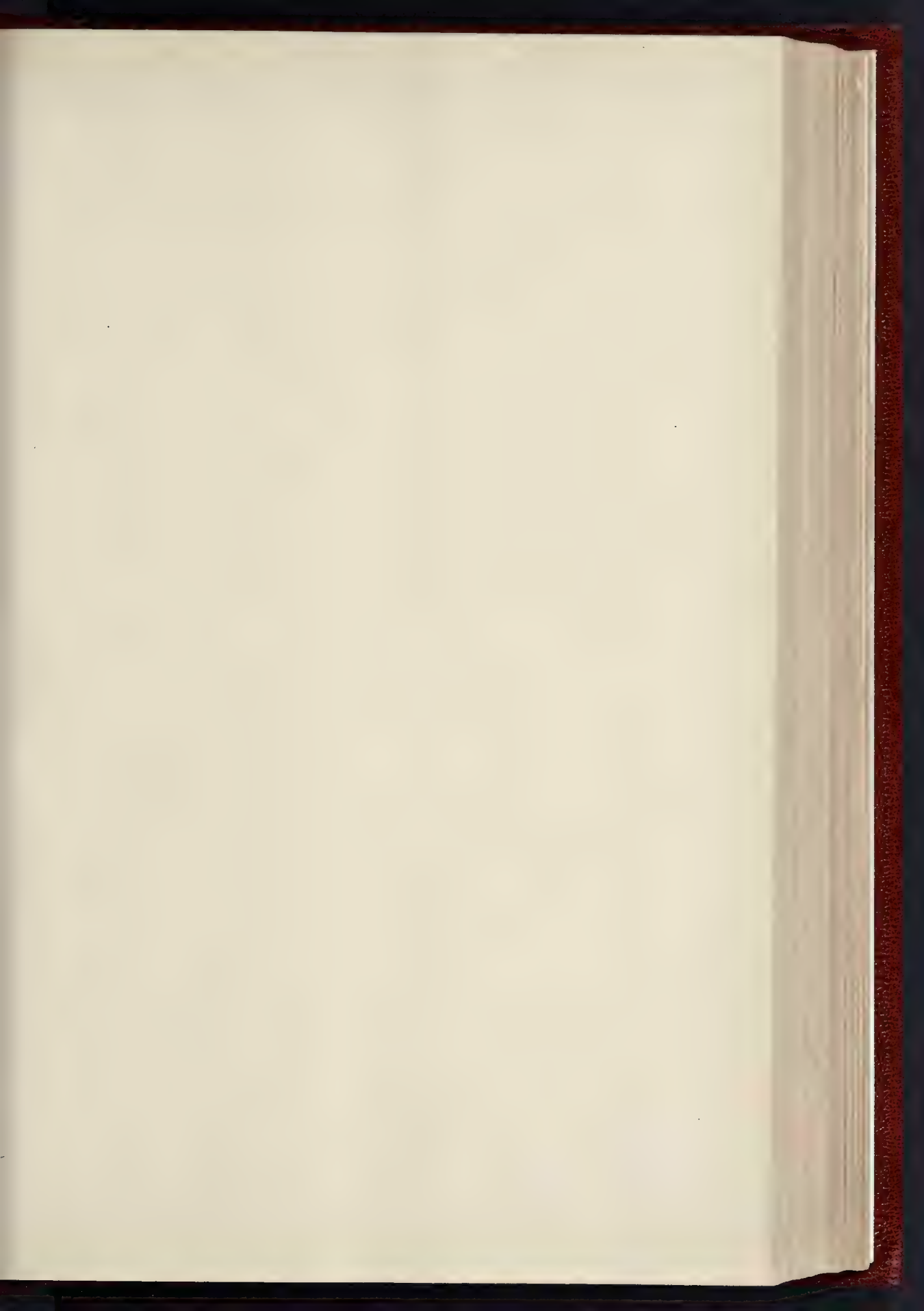
A vote of thanks was passed to the Chairman for presiding, and the meeting terminated.

THE LONDON COUNTY COUNCIL.

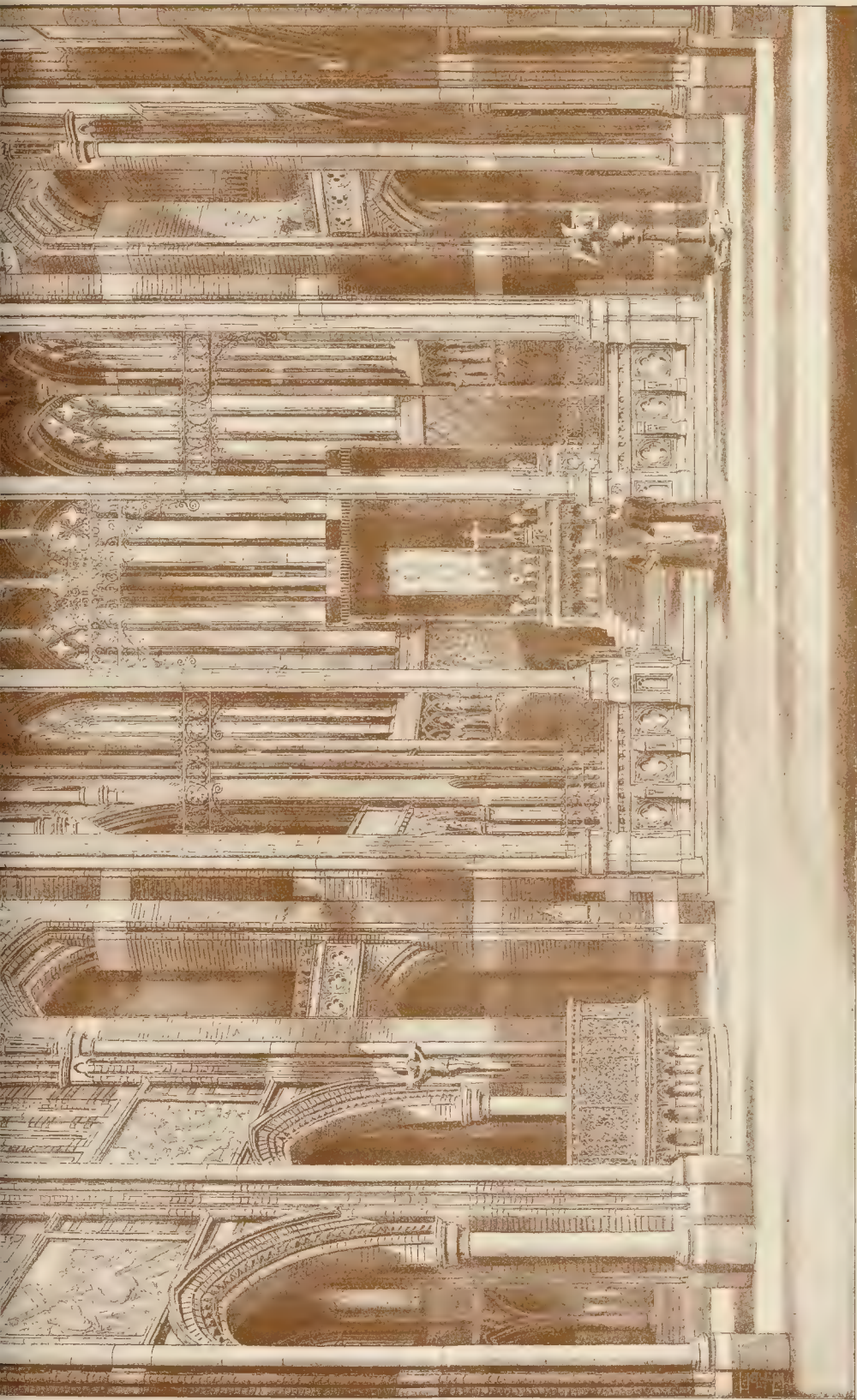
THE usual weekly meeting of this Council was held on Tuesday afternoon last at Spring-gardens, the Chairman, Mr. John Hutton, presiding.

The Chairman's Annual Address.—The Chairman, in accordance with the annual custom, gave a review of the past year's work of the Council. The address contained a great deal of interesting matter, but as it has been published in full in several of the London daily papers, we need only refer to those paragraphs which will be of special interest to our readers.

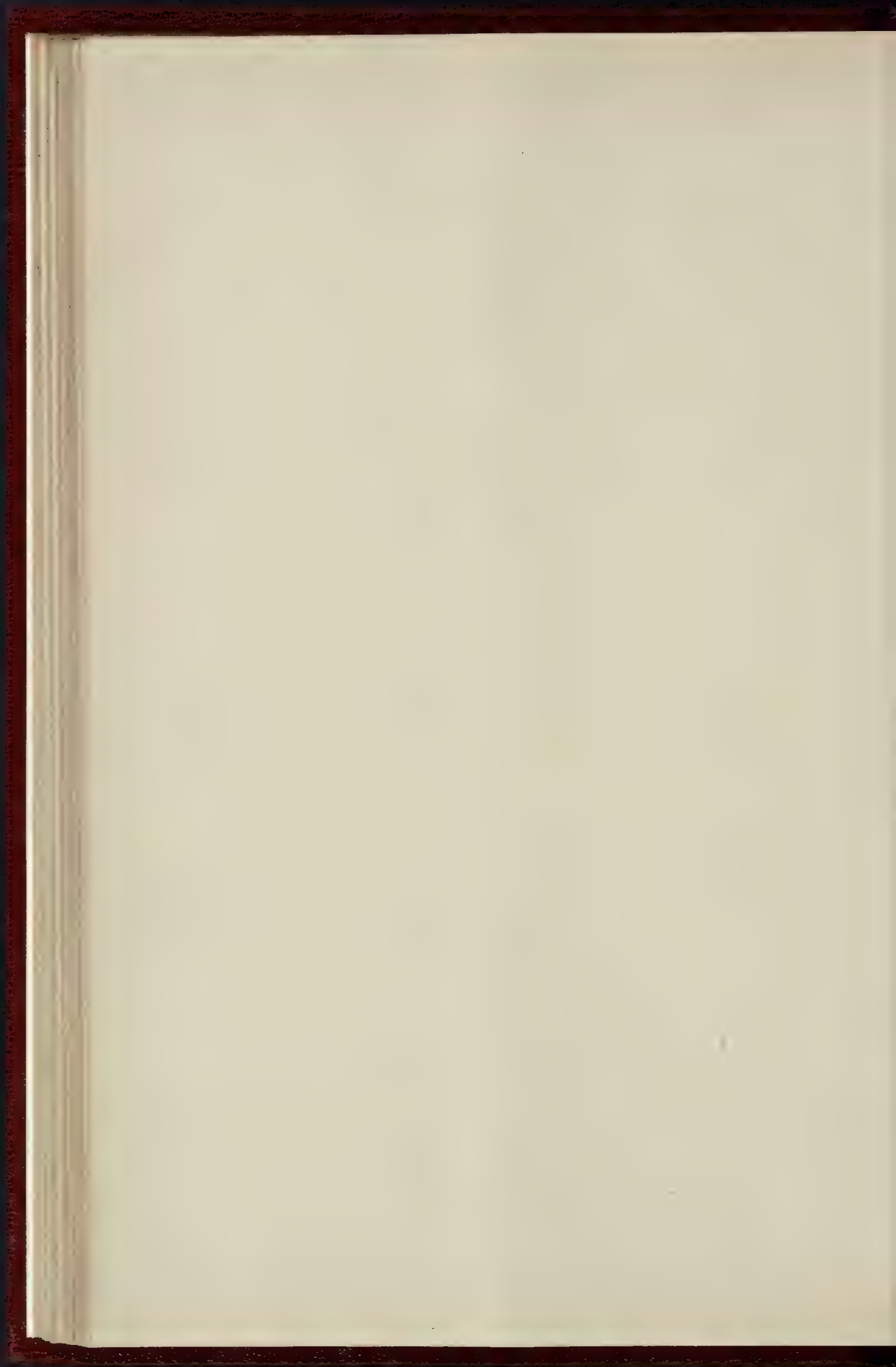
After giving some particulars of the proposed reconstruction of Vauxhall Bridge (see *The Builder* for October 1, 1892), Mr. Hutton remarked that the Bridges Committee wished to remind the Council that the existing carriage way of Waterloo Bridge being only 27 ft. 4 in. wide, the important question of altering this bridge to provide for the growing traffic would have to be considered at no distant date. He hoped that the Council would not seek to effect this improvement by any false economy marring the beauty of this magnificent structure. Any in the form of cheap ironwork would, he felt sure, meet with general disapproval. The address also contained the following paragraphs amongst others:—"The important works of the Blackwall Tunnel are making progress, and the members of the Council at a recent visit will have realised something of their extent and the special interest attaching to them. The four shafts are in course of erection, and the total value of the work executed to the end of the year has been estimated at 97,600l. . . . The year's dealings with regard to claims incident to the construction of the Tunnel amounted to 130,743l., which after negotiations were settled for 82,663l. The space at the landing stairs at Blackwall has been increased by 25 ft., making a total width of 50 ft. Although the General Powers Bill of the Council stands in a sadly attenuated form, after a long contest before the Committee of the House of Commons, the clause providing compensation to workmen who may be injured in the construction of the Blackwall Tunnel under compressed air stands part of the Bill. I sincerely hope that no cases of compensation will arise, but it will be a source of satisfaction to all concerned that the Council has







ALL SAINTS CHURCH WEST DULWICH INTERIOR. MR. G. H. FELLOWS FRANK. FRIBA., ARCHT.



the power to deal justly and properly with claims of such a nature should they arise. The approaches to Woolwich Ferry have already proved too narrow for the greatly increased traffic, 3,084,352 passengers and 251,929 vehicles having used the ferry during the year. A roadway of 60 ft. in width is therefore about to be formed. . . . The Building Act Committee . . . has dealt with a large number of cases of lines of frontage and formation of streets, the total length of which, sanctioned by the Council during the past year, is nearly nine miles. The numbers of nearly 6,000 houses have been re-arranged, and no less than 3,828 dangerous structures have been condemned. Magistrates' orders have been obtained against owners of property in 48 cases, and like orders against occupiers of property in sixty-four cases. The work of amending and consolidating the building law is still under the consideration of the Committee. . . . The work of the Improvements Committee and the progress of improvements has not been of a startling character. If ever there was an occasion that justified the Council holding its hand, that occasion, after the Council's numerous resolutions upon the subject, is the present. It would have been a great weakness if the Council had determined to proceed with a large improvement like, for instance, the Strand scheme, before a more equitable system of local taxation had been instituted. The Council continues to rely upon the Government finding new sources of revenue in addition to the readjustment of the amount of Exchequer contributions which have in the past been so stingily granted to London. London will be righteously indignant if her claims are neglected, and London improvements have to wait an indefinite time. It is, however, far better that the Council should get its source of revenue first and dispose of its income afterwards. The Council will no doubt avail itself of the opportunity of reconsidering the line of the proposed street from Holborn to the Strand, for the open ground existing at the last proposal before the Council contained the maximum of cost with the minimum of advantage. . . . Although the work of the Main Drainage Committee does not appear to the casual observer to be of a character to invite attention, yet it is of vast importance to London that those onerous and important duties should be ably and efficiently carried out. The total capital expenditure on main drainage works from their creation has been 7,455,922*l.*, and the annual expenditure for maintenance is 294,765*l.* It has been the good fortune of the Council to attract to the service of the Main Drainage Committee men of singular and pronounced aptitude for the duty. Mr. Macdougall is the present capable occupant of the chair. The improvement in the pumping stations has not only reduced floodings in low-lying districts, but it has tended to make possible the efficient cleaning of the river by enabling the precipitation operations to be carried on with something like the application of scientific skill. The new precipitation works at Crossness were completed and put in operation in the second week of June. Since that time the main sewage flow has been treated, the same method of treatment being adopted as the Barking outfall on the north side, and no discharge of crude sewage into the river now takes place. Taking the two outfalls together, the sewage treated last year amounted to nearly 64 billion gallons. The amount of sludge obtained stands at no less than 1,785,700 tons. The whole of this quantity has been consigned to sea by means of five huge vessels. The result has been that the river is generally admitted, by all persons competent to judge, to be in a better state than it has been for many years, especially in the lower reaches. The proposal made by some irresponsible persons that the only solution of the drainage difficulty is to be found in dividing the rain water from the sewage is of little practical value. It would cost twenty millions sterling to carry out such a system, and if it could be justified on financial considerations experts doubt very seriously whether it could be defended on sanitary grounds. A new school has been built at Crossness Station for the use of the children of the employees who live on the works. The tenders which were received for the erection of the school were so much above the estimate of the Architect that the Council did not feel it wise in accepting any one of them. The work has been executed by men directly employed by the Council, with a most satisfactory result. . . .

On the motion of Dr. Collins, it was resolved that the Chairman's address should be printed and circulated.

The Electric Light in St. Pancras.—The Finance Committee brought up a report containing the following paragraph and recommendations:—

"We have also considered the application of the Vestry of St. Pancras for the loan of 30,000*l.* for electric lighting works, repayable by annuity in 42 years. The Council has already sanctioned loans for 10,000*l.* for the purchase of gas, repayable in 40 years, and 60,000*l.* for works, repayable in 42 years. The 10,000*l.* was advanced by the Council, and the 60,000*l.* borrowed elsewhere, as the Council had no power at that time to lend for a longer period than 30 years. This restriction was, however, removed by section 7 (iv.) of the Money Act of 1892, and the term of 30 years fixed as the maximum limit. The Vestry state that beyond the

sum of 70,000*l.* above referred to, they have expended or propose to expend the further sum of 30,000*l.* on the following works:—Land, 254*l.* 9*s.* 3*d.*; buildings, 3,276*l.* 2*s.* 4*d.*; boilers, &c., 943*l.* 0*s.* 4*d.*; engines and dynamos, 1,833*l.* 7*s.* 5*d.*; switchboards, 571*l.* 4*s.* 10*d.*; batteries, 215*l.* 14*s.* 11*d.*; trenches, 6,164*l.*; electrical conductors and sundry works, including royalties (and 8,000*l.* for public street lamps), 16,964*l.* 1*s.* 8*d.*; making a total of 30,000*l.* We are informed that the plans of some of these works have not been approved by the Council, and others have been constructed outside the limits of supply of the vestry. The total cost in respect of which the plans have been approved amounts to 75,435*l.*, in respect of which a loan of 60,000*l.* was sanctioned repayable over 42 years, without reference to the life of the work. This will reduce the amount of the loan now to be granted to 15,435*l.* If regard is had to the life of the work, as has previously been done in loans made by the Council, the amount expended would be spread as to 47,344*l.* over 30 years, 23,610*l.* over 15 years, 1,984*l.* over 8 years, and 2,497*l.* over 5 years, leaving the sum of 15,435*l.* now to be dealt with to be spread, as to 10,954*l.* over 15 years, 1,984*l.* over 8 years, and 2,497*l.* over 5 years. It is, however, contended that the whole of the outlay should be treated as initial cost, and placed on a similar footing as an investment of capital by a public company, the necessities of the case requiring that the whole of the plant and machinery should be kept in perfect condition to perform the work required, and that the cost of maintenance and renewals will be borne by the receipts in aid, or out of the general rate of the parish. We think that there is considerable force in this contention, and that the Council may reasonably be asked to assist the vestry in the development of this new system of lighting the parish. We think it desirable, under the circumstances stated, to submit two recommendations (a) for the Council to sanction the borrowing of 15,400*l.* for the period of 42 years only, and (b) should they see no objection to departing from the previous practice of limiting the loan to the life of the work, both to sanction the loan and also lend the money. We recommend—

(a) That the sanction of the Council be given under seal to the borrowing by the Vestry of St. Pancras of the sum of 15,400*l.* towards defraying the cost of certain electric lighting works, at a rate of interest not exceeding 3*l.* 10*s.* per annum, to be repaid either by the annuity instalment method, within a period of forty-two years from the date of the loan.

(b) That, subject to the Council hereafter giving its written consent under seal to the borrowing, and subject to all necessary consents and evidence being furnished to the satisfaction of the Solicitor of the Council, the application of the Vestry of St. Pancras, for a loan of 30,000*l.* towards defraying the cost of electric lighting works, in the parish be granted, to the extent of 15,400*l.*, on condition that the same be taken up at once, interest being calculated thereon at the rate of 3*l.* 10*s.* per cent. per annum, calculated quarterly, and with the principal being repaid by such equal half-yearly payments of principal and interest combined as will repay the amount borrowed within a period of forty-two years; that it be referred to the Solicitor to take the necessary measures for completing the loan, and that the amount be advanced out of the Consolidated Loan Fund.

The consideration of these two recommendations gave rise to considerable discussion, but ultimately they were agreed to.

Taxing and Sewerage Works, &c. The Council, on recommendations by the same Committee, agreed to lend the St. Pancras Vestry 5,600*l.* towards granite paving, and 24,000*l.* for wood-paving; the Strand District Board 7,000*l.* for wood and asphalt paving works; the Shoreditch Vestry 5,900*l.* for sewerage works at Haggerston; the Battersea Vestry 3,000*l.* towards defraying the cost of opening up the Shaftesbury Park, the Beaufoy, and the Queen's-road estates, Wandsworth; 5,100*l.* for sewerage works in various streets in the parish; and 2,300*l.* towards certain street improvements.

Appointment of Comptroller.—On the motion to appoint Mr. H. E. Haward Comptroller of the Council, at the commencing salary of 700*l.*, rising to 1,000*l.* a year, several amendments were proposed and rejected, and the resolution was passed.

A Statistical Department.—It was also resolved, on the recommendation of the General Purposes Committee, that there should be formed a Statistical Department, and that Mr. G. L. Gomme should be appointed Head of the Department at a salary of 600*l.*, rising to 700*l.* a year by two annual increments of 50*l.*

Proposed acquisition of Lincoln's-inn-fields.—The Parliamentary Committee's report contained the following paragraph and recommendations:—

"We have considered the resolution passed by the Council on the 13th June referring back to us our report recommending the re-introduction of the Bill relating to Lincoln's-inn-fields, with instructions to consider whether the Bill should not be amended, in view of the decision of the Committee of the House of Lords to strike the clause relating to Lincoln's-inn-fields out of the Open Spaces Bill of the present session. We have consulted the Solicitor

and the Parliamentary Agent, and are advised that the way in which the Council would be most likely to be successful in obtaining possession of Lincoln's-inn-fields as an open space for the public would be by seeking compulsory powers of acquisition under the terms and provisions of the Lands Clauses Acts. We concur in this opinion, and recommend—

That we be instructed to prepare a bill for the compulsory acquisition of Lincoln's-inn-fields under the provisions of the Lands Clauses Acts, and that communications be made to the Benchers of Lincoln's-inn and the trustees of the gardens indicating the intentions of the Council, and asking for any observations which they may have to make thereon, and also inviting them to enter into a conditional contract for the sale of the area within the square."

The recommendation was agreed to.

Proposed Theatre, Fulham-road.—The Theatres and Music Halls Committee's report contained the following paragraph and recommendation:—

"We have considered seven drawings, dated 11th July, 1893, submitted by Messrs. Essex, Nicol, & Goodman, on behalf of Mr. Rollo Balmain, for a proposed new theatre at the corner of Fulham-road and Epple-road. The premises will accommodate 1,041 persons. We recommend—

That the seven drawings, dated 11th July, 1893, be approved, provided the access to the heating apparatus in the basement be altered so that the room can only be entered from the outside, and be separated from the space under the stage by a brick wall, or self-closing iron doors fitted in iron frames; that upon the completion of the premises to the satisfaction of the Council, and subject to the building complying in all respects with the Council's regulations, and being carried out in accordance with the drawings, the Metropolitan Building Act, the Metropolitan Management Act, and the Acts amending the same, a certificate under the Metropolitan Management and Building Acts Amendment Act, 1878, be sealed and issued to the owner of the premises."

The recommendation was agreed to without discussion.

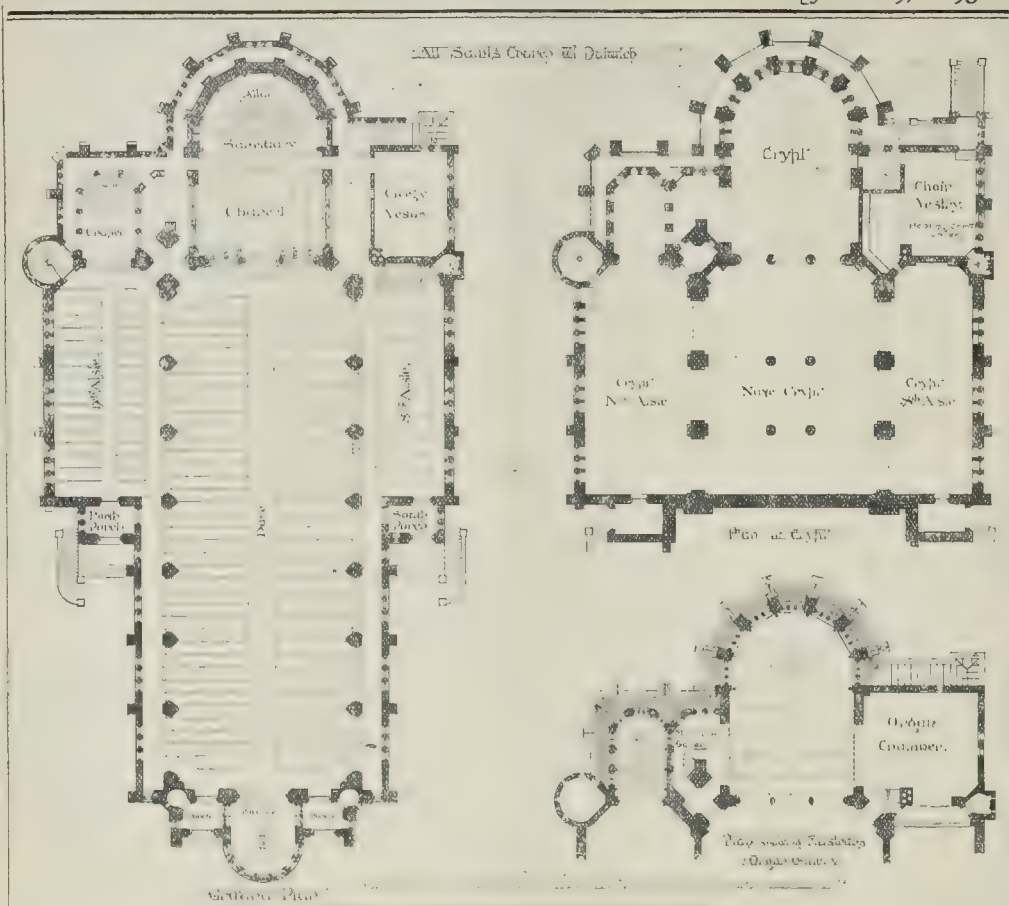
After transacting other business the Council adjourned until Friday, having sat five hours.

COMPETITIONS.

WORKMEN'S DWELLINGS, PLYMOUTH.—The assessor (Mr. Charles Barry) appointed by the Plymouth Town Council to decide as to the merits of the plans submitted for workmen's dwellings at Howe-street and Looe-street, Plymouth, has awarded the premiums as follows:—Howe-street and Looe-street: first, Mr. Locke Warthington, Westminster; second, Messrs. Sanders & Lucas, Southampton; third, Mr. J. Archibald Lucas, Exeter. Prince-rock: first, Messrs. Hine & Odgers, Plymouth; second, Messrs. King & Lister, Plymouth; third, Mr. C. S. Webbe, 101, Cannon-street, City.

INSTITUTE OF CERTIFIED CARPENTERS.—The first annual dinner of this Institute was held on Saturday last at Carpenters' Hall. The qualification for membership is that of passing the examinations held annually at Carpenters' Hall. The subjects for examination comprise:—"Timber, English, Foreign, and Colonial: Its Decay, Preservation, and Use"; "Timber Roofs, also Composite Roofs"; "Doors, Windows, and Ornamental Joinery"; "The Setting Out and Construction of Staircases and Joists in Joinery"; "The Framing and Construction of Partitions, Floors, and Temporary Structures." Professor Banister Fletcher, F.R.I.B.A., occupied the chair, and amongst those present were Mr. Henry Adams, M.Inst.C.E., Mr. Henry Angel, Mr. C. F. Mitchell (Master of the Carpenters' Company), and Mr. Stanton W. Preston. Among the toasts given was "Success to the Certified Carpenters," in reply to which the Secretary explained the origin of the Institute and its success, announcing that sixteen new members had joined during the past year. The President, in reply to the toast of his health, said that whilst the increase of the Institute must be limited, because the qualification was the passing of what has been called a stiff examination, still he was hopeful that gradually all the trade would pass the examination and so be eligible as members. He pointed out that there was a growing feeling that the method of work of the past fifty years—namely, the production of articles on which were expended the least amount of time and trouble—was departing, and that the new creed would be that every man would throw into his work earnestness and endeavour to produce the best work for the love of the work itself, and thus rival the splendid work the carpenters and joiners of the Middle Ages produced, and raise the trade to a higher and nobler standard.

PROPOSED IMPROVEMENTS AT DOUGLAS, ISLE OF MAN.—At the final sitting for the present session of the Manx Tynwald Court, on the 20th inst., leave was given to introduce a Bill to construct a swing bridge over Douglas harbour, at an estimated cost of 10,000*l.* This will bring Douglas into direct communication with Douglas Head. Votes were granted for extensive improvements at Laxey and Douglas harbour, so as to facilitate the entrance and berthing of larger steamers.



Illustrations.

THE SHAFTESBURY MEMORIAL FOUNTAIN, PICCADILLY-CIRCUS.

WE give a view of this fountain, the design of Mr. Alfred Gilbert, R.A., from a photograph specially taken for the purpose from the north-west part of Piccadilly-circus. The stone balustrade which encloses the fountain is omitted, as it would have been impossible, if including that, to get the fountain itself on a sufficiently large scale to form an adequate illustration.

On the general design of the work we have already commented (see page 25, *ante*). We may add here that we presume that the idea of the crowning figure with the bow, the meaning of which has given rise to a great deal of conjecture, was suggested by a kind of play on the first syllable of the word "Shaftesbury"—the archer discharging his "shaft" or arrow; but we have not the authority of the sculptor for this interpretation. It would serve sufficiently as an excuse for a figure the main object of which, after all, is to make a pleasing termination to the design and to introduce into it a feature of pure sculpture.

ALL SAINTS' CHURCH, WEST DULWICH.

THESE illustrations are from drawings of the original design made for the above-named church by Mr. George H. Fellowes' Prynne, in 1888, and since partially carried out for the Rev. James Beeby, Vicar. Quantities were supplied by Mr. R. Henry Hale, and tenders for the whole work were obtained. The funds being inadequate, it was determined to build the church in sections.

* Not "Fellowes," as erroneously given on the lithograph.

The first contract included the foundations at the east-end, which were carried out by Messrs. Kynock & Co., the foundation-stone being laid on All Saints' Day, 1888. The second contract included crypt, chancel, chapel, vestries, north and south transepts, and three-and-a-half out of seven bays of the nave, the fleche and tower being, for want of funds, temporarily cut off at roof-level. The second contract was carried to completion by the firm of Messrs. J. & C. Bowyer, of Upper Norwood.

The salient points of the design are as follows:—The site has a fall of 28 ft. from west to east. The nave floor taking the western level, space is obtained for a spacious crypt for parochial uses, heating, and other purposes.

The main scheme of the church shows a lofty nave, 60 ft. high and 40 ft. wide and 128 ft. in length, divided into seven double-arched bays, the piers being built of red brick and stone. Panels for decoration are formed over lower arches, and a clearstory in spandrels above. Three eastern bays open into the north and south transepts. The chancel and sanctuary are the same height as nave, 28 ft. wide and 44 ft. in length.

The altar, which is elaborately carved and richly decorated in gold and colour, is 12 ft. in length, and is placed eleven steps above the nave floor level, and a good effect obtained, both externally and internally, by seven lofty windows at eastern end. Under these windows sixteen niches are formed in the brickwork, with carved stone brackets supporting statues of the twelve Apostles and various other saints, the figures being the work of Mr. J. E. Taylerson, sculptor. Beneath these figures are placed the sedilia, piscina, and ambry. The dividing arch between the chancel and nave is enriched with tracery supported by two slender columns rising from the lower screen. A wrought-iron roof-screen spans the spaces between columns. The northern tran-

sept forms the nave of a chapel, the sanctuary of which is placed on the northern side of the chancel; clergy and choir vestries and organ chamber are placed on the south side of chancel. An ambulatory runs entirely around the east end of chapel and chancel, connecting the northern turret with the vestries. Space is obtained for a musicians' gallery between chancel and chapel, both of which it faces. As the means at the disposal of the architect were wholly inadequate to admit of a tower or spire of large dimensions, he has designed a kind of minaret tower, which, while it is in accordance with the feeling of the design generally, is sufficiently large to admit of a peal of bells. The tower is placed angle-wise to the building, the arches at the base by this means forming a double squint for the high and chapel altars.

An apsidal baptistery is placed at the west end, with porches north and south.

The church is heated by hot-water and small-bore pipes, by Mr. De Ridder.

At present the church has a somewhat cramped appearance, as only half the length of the nave is completely finished.

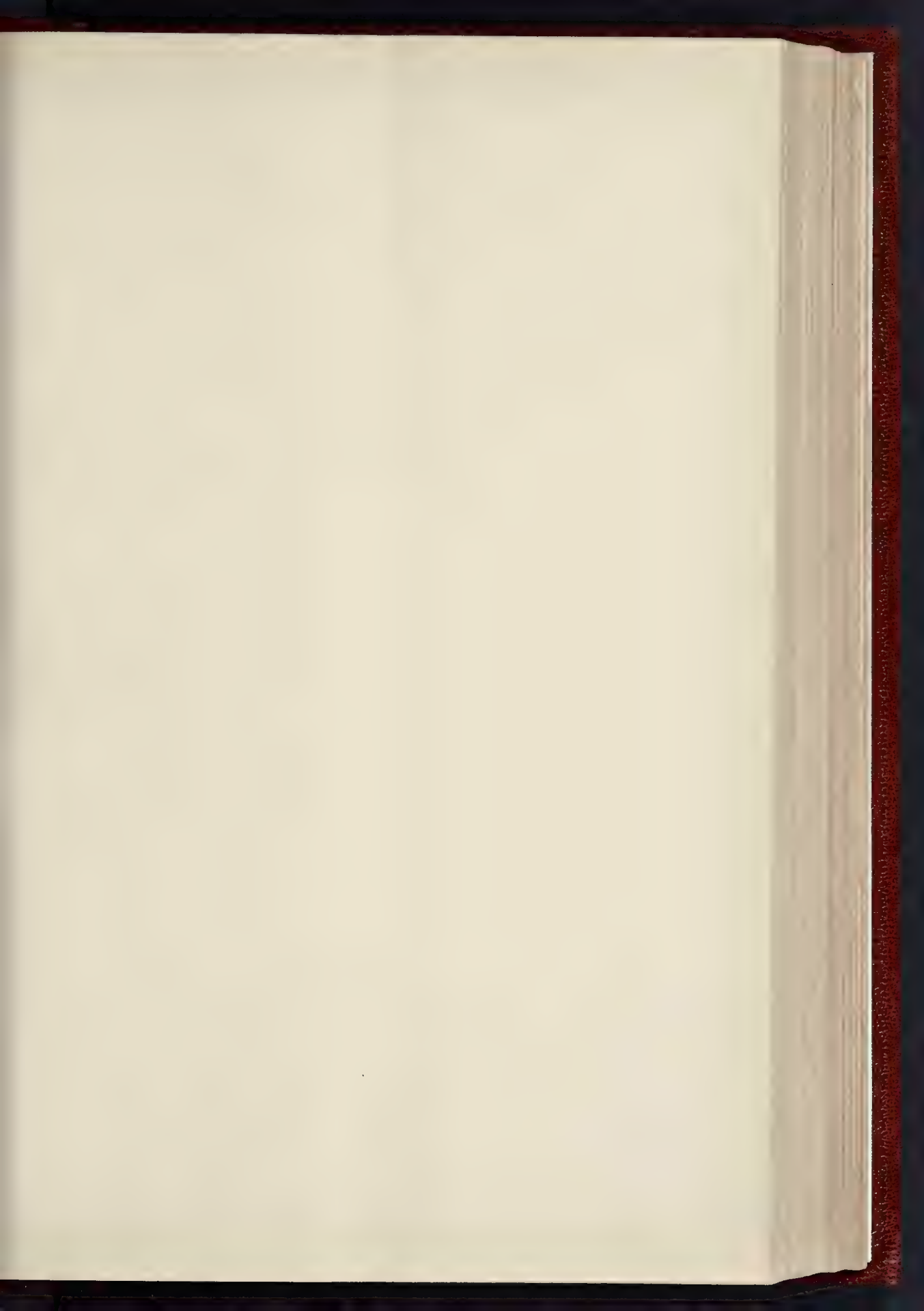
The present portion of the church will accommodate some 950 persons, and, when complete, about 1,400.

The total outlay of the present portion of the building has been nearly 13,000*l*. The estimated cost of completing the portions at present left unfinished is 5,000*l*.

COMPETITION DESIGN FOR OXFORD MUNICIPAL BUILDINGS.

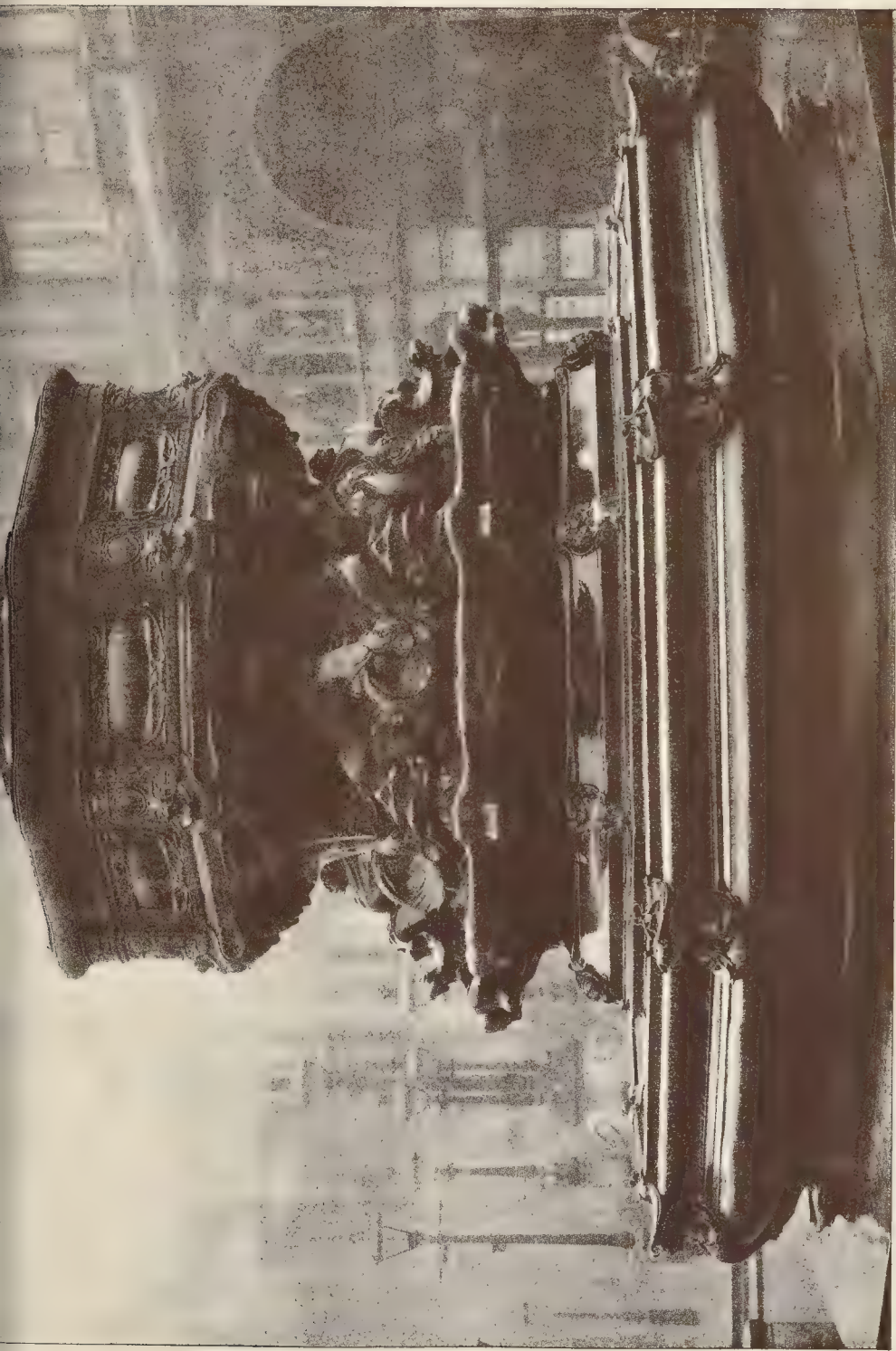
THE design illustrated was one submitted in the preliminary competition.

The elevations and the details of the exterior were designed with the view that the building should be carried out in bluish or flesh coloured

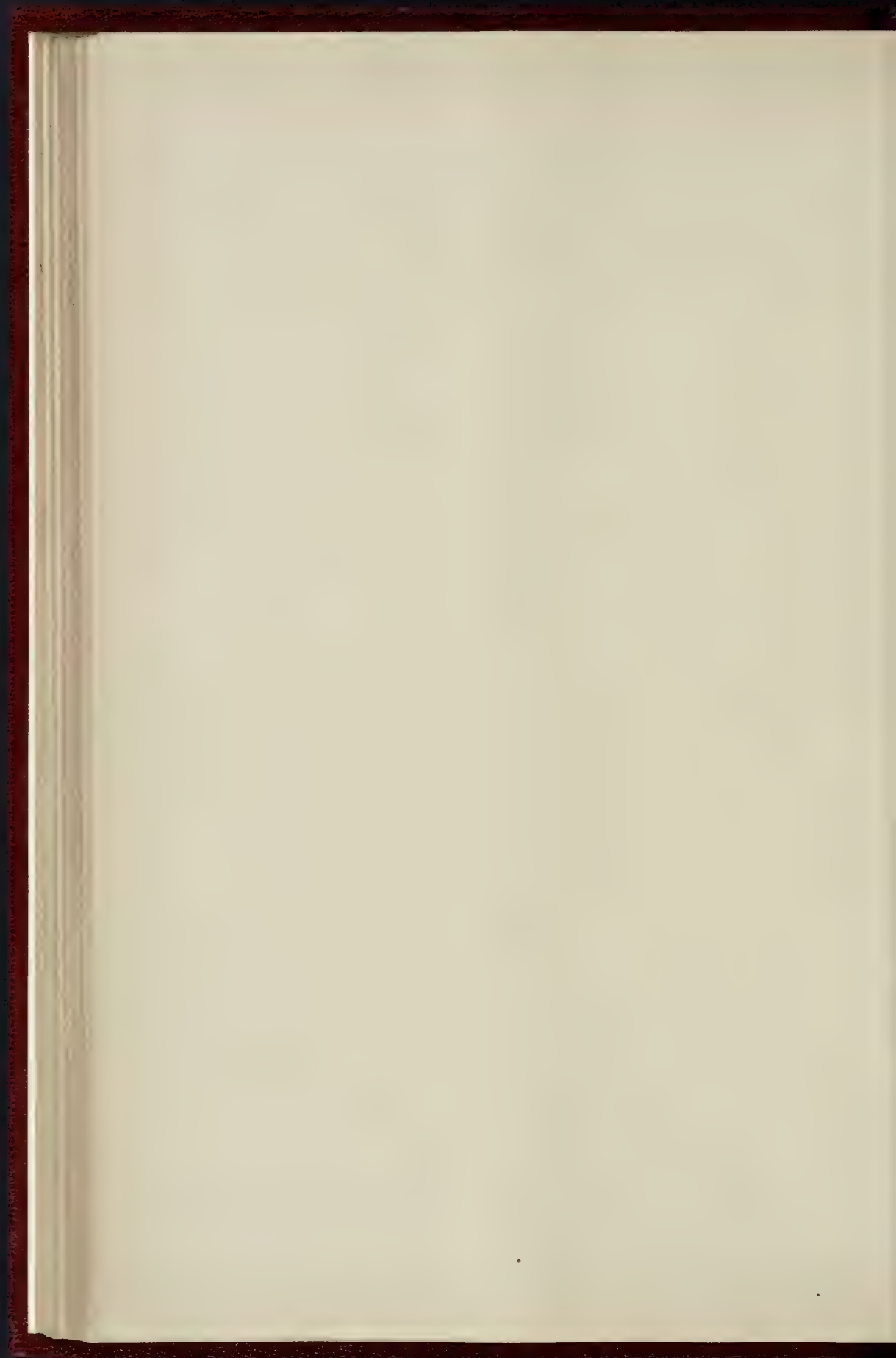


THE BUILDER, JULY 29, 1893.





THE SHAFTESBURY MEMORIAL FOUNTAIN, PICCADILLY CIRCUS.—DESIGNED BY MR. ALFRED GILBERT, R.A.





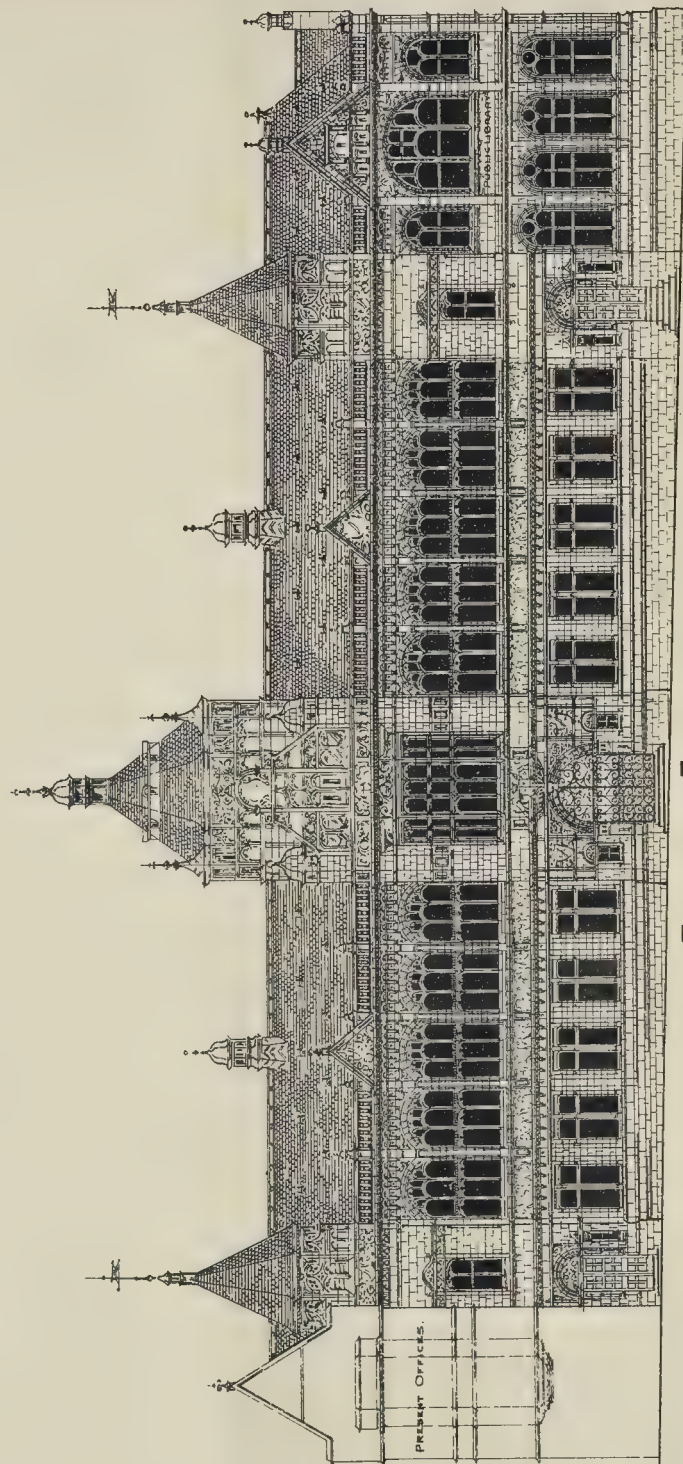
THE BUILDER, JULY 29, 1893.

CITY OF OXFORD

PROPOSED MUNICIPAL BUILDINGS

Cheston & Perkins Architects

ONE OF THE FIVE PREMIATED DESIGNS



FRONT ELEVATION.

0 10 20 30 40 50 60 70 80 feet

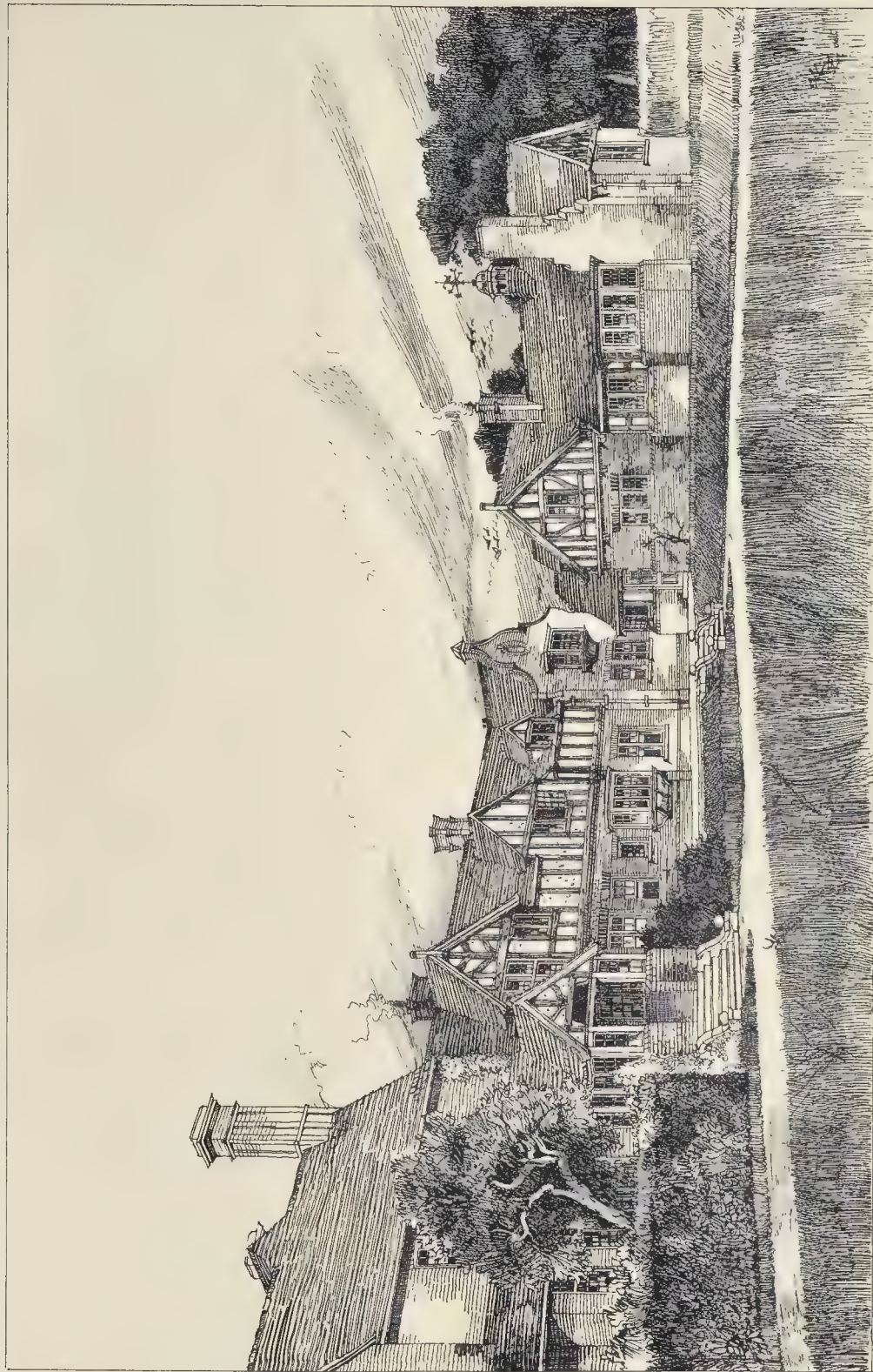
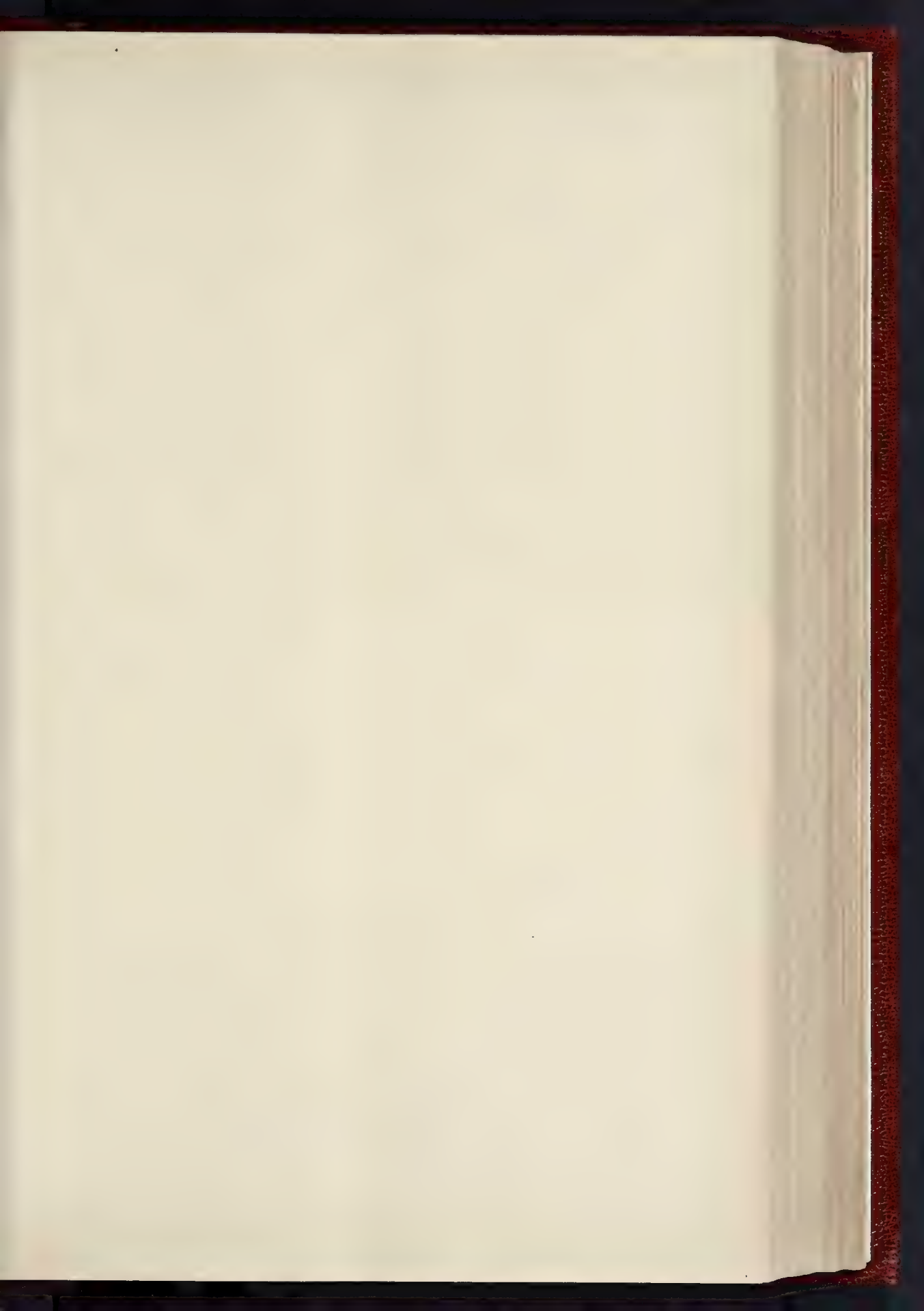
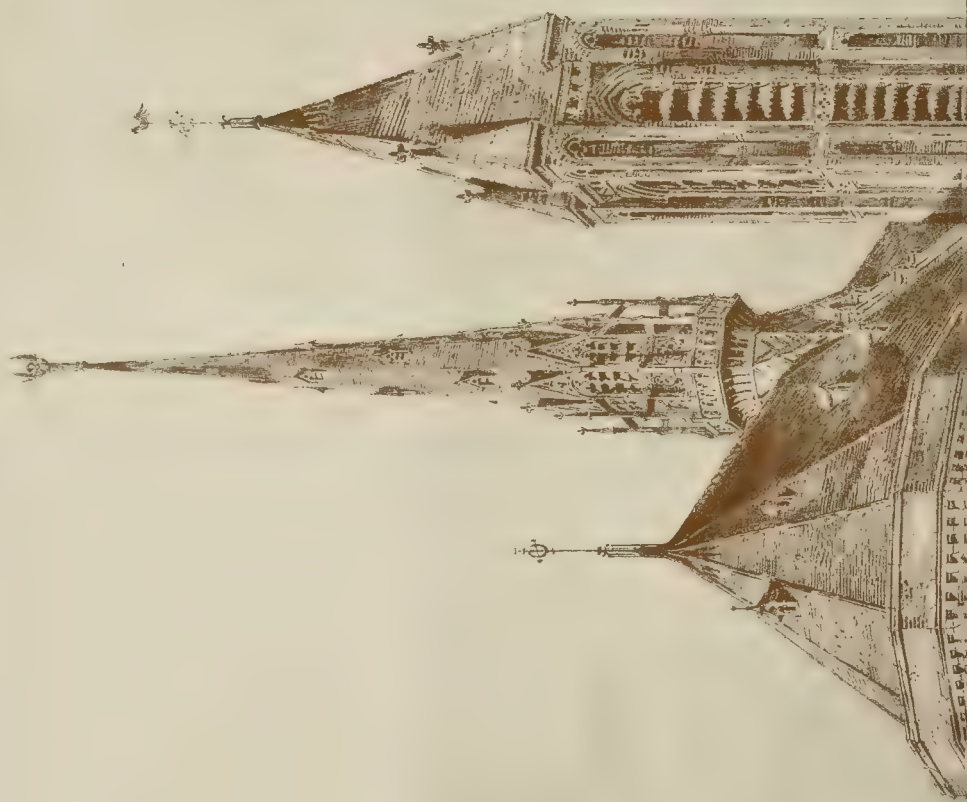


FIG. 1. THE BUILDING OF THE ROXLEY, JULY 29, 1893.

ADDITIONS TO "ROXLEY"—MESSRS WIMPERIS & ARBER, ARCHITECTS

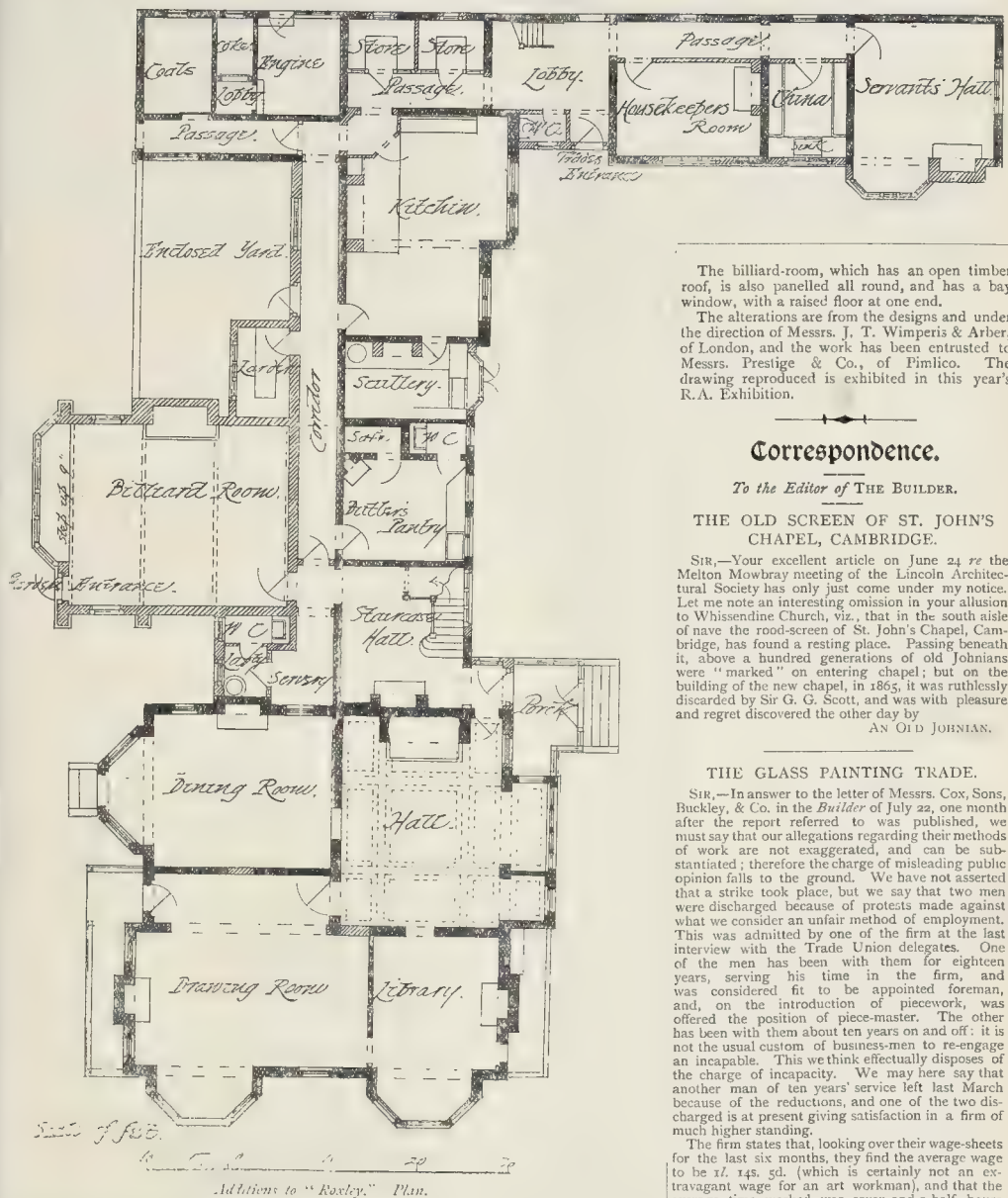
Royal Academy Exhibition, 1893







ALL SAINTS CHURCH WEST DULWICH ENGLAND. MR. G. H. FELLOWS PRINCIPAL ARCHITECT.



The billiard-room, which has an open timber roof, is also panelled all round, and has a bay window, with a raised floor at one end.

The alterations are from the designs and under the direction of Messrs. J. T. Wimperis & Arber, of London, and the work has been entrusted to Messrs. Prestige & Co., of Pimlico. The drawing reproduced is exhibited in this year's R.A. Exhibition.

Correspondence.

To the Editor of THE BUILDER.

THE OLD SCREEN OF ST. JOHN'S CHAPEL, CAMBRIDGE.

SIR,—Your excellent article on June 24 *re* the Melton Mowbray meeting of the Lincoln Architectural Society has only just come under my notice. Let me note an interesting omission in your allusion to Whissendine Church, viz., that in the south aisle of nave the rood-screen of St. John's Chapel, Cambridge, has found a resting place. Passing beneath it, above a hundred generations of old Johnians were "marked" on entering chapel; but on the building of the new chapel, in 1865, it was ruthlessly discarded by Sir G. G. Scott, and was with pleasure and regret discovered the other day by

AN OLD JOHNIAN.

THE GLASS PAINTING TRADE.

SIR,—In answer to the letter of Messrs. Cox, Sons, Buckley, & Co. in the *Builder* of July 22, one month after the report referred to was published, we must say that our allegations regarding their methods of work are not exaggerated, and can be substantiated; therefore the charge of misleading public opinion falls to the ground. We have not asserted that a strike took place, but we say that two men were discharged because of protests made against what we consider an unfair method of employment. This was admitted by one of the firm at the last interview with the Trade Union delegates. One of the men has been with them for eighteen years, serving his time in the firm, and was considered fit to be appointed foreman, and, on the introduction of piecework, was offered the position of piece-master. The other has been with them about ten years on and off; it is not the usual custom of business-men to re-engage an incapable. This we think effectually disposes of the charge of incapacity. We may here say that another man of ten years' service left last March because of the reductions, and one of the two discharged is at present giving satisfaction in a firm of much higher standing.

The firm states that, looking over their wage-sheets for the last six months, they find the average wage to be 1*l.* 1*s.* 5*d.* (which is certainly not an extravagant wage for an art workman), and that the average time worked was seven-and-a-half hours per day, which, to be correct, gives nearer ninepence than tenpence per hour as an average.

The first man we mention was paid eleven pence per hour before the introduction of piece-work, and working fifty hours per week made his wage 2*l.* 5*s.* 10*d.*, a difference in favour of the old system of 1*s.* 5*d.* on their own showing, and during the six months quoted 446½ hours of his time were given to photographic and shop work for which he was paid at the old rate, leaving, at 7½ hours per day, 723½ hours devoted to piece-work, for which he got 2*l.* 0*s.* 3*d.*, an average of 7½*d.* per hour, but as he made a point of putting in eight hours per day the average is reduced to 6½*d.*

The other man was in no better condition, and we again say that the specific alteration in price was made after the work was started, and the reason given was that the work had been underestimated; also the character of the work was not simplified and one man was told to do it exquisitely neat. The advances in prices given at different times and quoted at the meeting were not given in the spirit claimed, but in all but one instance were extracted with difficulty. In one case the men refused to take a job at the price offered, and were given an extra sovereign.

"RONLEY," WILLIAM, HERTS.

THESE alterations, which consist more of conversions than of additions, are, in an amended form, now in course of execution.

The plan published herewith shows a long and straggling old house, the wing building having until now been formed by stables and coach-houses, which have been converted into kitchen offices.

This adaptation has dominated the external treatment, rendering it difficult to obtain anything like simplicity or uniformity in the front as a whole.

The materials used are red brick facings, with half-timber work above, and Broseley tiles for roofs.

The hall, which runs up through two stories, is panelled in old oak, with a panelled oak gallery running along one side of it, and the ceiling is in oak in keeping with same.

terra-cotta, the roofs being covered with green Westmoreland slating, the flat portions being covered with lead and the areas faced with white glazed bricks.

Internally it was proposed that the walls of the entrance-lobbies, hall, and grand staircase, and the greater portion of the internal walling of the town hall, council chamber, assembly-room, and front committee room should be finished in terra-cotta, the ceilings being covered with ornamental carton pierre, and the doors, panelling, gallery-fronts, and joinery-work generally being executed in oak, the flooring in these rooms being also of oak laid in narrow widths.

The steps to the grand staircase were to have been of marble, with terra-cotta balustrading.

The design is by Messrs. Cheston & Perkin, and the drawing is hung in the Architectural Room of the Royal Academy.

In speaking of the ornamentalists, who are said not to be artists in the true sense of the word, there is room for discussion, as many artists are constantly employed upon ornament, and it is rather sweeping to deny the name of artist to all but those engaged upon figure painting.

The concluding remarks relative to the superiority of piece-work to time-work are so obviously absurd as to require no refutation, and, in conclusion, allow us to say that we have acted all through this dispute with moderation and fairness, not bringing it to the notice of the public until all other attempts failed, and the final case cited, in which a man worked forty hours for twenty shillings, or sixpence per hour (for which we have documentary evidence), forced us to take that course. Being confident of the justice of our case, we desire that the strongest light shall be thrown upon it.

COMMITTEE OF GLASS PAINTERS' UNION.

"DANGEROUS STRUCTURES."

SIR,—In thanking you for your recent notice of my little work, I should like to make an explanation which may serve as a warning to others engaged in producing technical books, and which may also, in a measure, exonerate me. Your reviewer refers to the incorrect lettering to the diagrams in my book, which he justly regards only evidence of careless editing. I drew the diagrams and lettered them myself, and the lettering was reproduced correctly upon the blocks. But the printer thought to improve the appearance of the work by cutting the lettering out of the blocks and substituting type. This he did at the last moment, and without sending me any proof of the altered lettering. Consequently I only detected the errors when it was too late to revise them; and the blame is naturally thrown upon me.

GEORGE H. BLAGROVE.

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS' MEETING.

SIR,—I notice in your report of the proceedings of the above meeting the following paragraph. "Mr. Massie (Wakefield) thought it would be an advantage if members were supplied with a printed copy of the annual report."

May I be allowed to say that some mistake must have occurred, as I did not speak on the proposition, and actually voted against it.

FRANK MASSIE.

The Student's Column.

GEOLOGY.—V.

CHEMISTRY OF THE EARTH'S CRUST.

THE chemical constitution of the earth's crust is a complicated subject, respecting which we need only say a few words. The preceding series of articles in this column on "Chemistry" have sufficiently described the nature and occurrence of chemical elements. Of all the elements, not more than sixteen help to build up the crust of the earth to any appreciable extent; the others are comparatively rare and unimportant, so far as our purpose is concerned. These sixteen form about 99 per cent. of the earth's crust, and they have been divided into two groups—(1) the metalloids, and (2) the metals.

Metalloids.—The most important and abundant is oxygen, which forms about 23 per cent. by weight of air, 88·87 per cent. of water, and about one-half of all the rocks composing the crust of the globe. The next in abundance is silicon, which, united with oxygen, forms silica—a main ingredient in the composition of the majority of crystalline and fragmental rocks. Other common metalloids are carbon, sulphur, hydrogen, chlorine, phosphorus, and fluorine.

Metals.—The metallic constituents of the earth's crust have largely entered into combination with oxygen. Amongst the metals we may enumerate the following elements, in order of their relative abundance:—Aluminium, calcium, magnesium, potassium, sodium, iron, manganese, and barium. Aluminium, in combination with oxygen, forms alumina, but its most common condition is in union with silica, in which form it constitutes the basis of a large variety of rocks. Calcium is most abundant in nature, in union with carbon dioxide, occurring as solid rock, or dissolved in water; in the latter state it is one of the most universally diffused mineral matters in rivers, lakes, and oceans. The other metallic elements play a much less conspicuous part in the constitution of the crust.

The three acids with which most of the bases have been combined are silicic, carbonic, and sulphuric; we shall have more to say respecting these in subsequent articles.

ROCK-FORMING MINERALS.

The chemical elements found in the earth's crust, as the student has doubtless gathered from the foregoing observations, mainly occur in composite forms. Minerals may be constituted of one chemical element only—such as gold or silver; but they are mostly made up of two, or three, or more elements combined. They possess certain physical peculiarities by which they may be distinguished from one another. For instance, minerals are very variable in point of hardness, and mineralogists have found it convenient to divide them into ten stages or degrees, each of which is illustrated by some characteristic mineral as a standard of comparison. These, commencing with the softest, are:—1, Talc; 2, Rock salt; 3, Calc spar; 4, Fluor spar; 5, Apatite; 6, Felspar; 7, Quartz; 8, Topaz; 9, Corundum, or emery; and 10, Diamond. The diamond is the hardest known mineral. The degree of hardness of minerals does not necessarily govern their toughness; some, such as flint, although very hard, are brittle, and break with a peculiar fracture.

The forms assumed by minerals are described by various terms—when geometrical forms are developed the minerals are said to be *crystallised*; when they are without any definite form they are called *amorphous*; when lens-shaped, *lenticular*; needle-like, *acicular*; star-like, *stellate*, and so on. The definite geometrical forms which mineral substances assume under favourable circumstances are known as *crystals*; and minerals are said to crystallise in the following six different systems, according to the particular form, or forms, they take on—1. Cubic, or Octahedral; 2. Tetragonal, or Pyramidal; 3. Rhombic, or Prismatic; 4. Hexagonal, or Rhombohedral; 5. Monoclinic, or Oblique; and, 6. Triclinic, or Anorthic.

Many minerals have a tendency to split along certain definite planes, termed *planes of cleavage*. These latter bear a constant relation to a certain face, or to certain faces of the form in which the mineral crystallises. The majority of minerals are capable of being cleaved in several directions, but there is generally one direction which splits with greater facility than the others.

The specific gravity of minerals is also very variable, ranging from 1 to 19, according to the particular kind. Some possess distinctive odours; others are characterised by their taste, touch, flexibility, elasticity, magnetic properties, colour, lustre, degree of transparency, or peculiar optical phenomena.

The student will readily perceive that the mineralogist has a variety of means at his disposal whereby to determine a given mineral, and very rarely indeed does a common rock-former present much difficulty to him. Even if it is very minute, the microscope is brought in, whilst in other cases he tests its fusibility and appearance under the flame of the blow-pipe, and he may be able to make a chemical analysis of the substance. At the same time it may be next to impossible to accurately determine the species of a mineral substance which has undergone much decomposition, though even then he could often surmise its former character from concomitant circumstances. Slight difficulties are sometimes presented by *pseudomorphs*—minerals having a form characteristic, not of their own, but of some other substance. These have mostly been fashioned in the following manner:—A mineral crystallising, say, in the monoclinic system, has decayed, and its substance having in the ordinary course of nature been removed from the stone, a cavity resulted and a cast of its form was left in the matrix in which it was embedded. Subsequently, mineral matter in solution penetrated the stone and filled up the cavity, and the infiltrating mineral has assumed the outward form of a monoclinic mineral, whether it really crystallised in that system or not. Thus, by taking a cast of the mineral which originally occupied the cavity, a hexagonal form might be made to assume a monoclinic aspect outwardly.

The term *rock* is applied to any mass of mineral matter consisting of one or more simple minerals. In ordinary language a "rock" is generally understood to mean a hard substance, but the geologist employs the term to designate mineral masses of all kinds, whether hard or soft. To him, clays and sands are rocks, quite as much as are granites and marbles.

There are many different kinds of rocks, composed of a variety of minerals, but a very superficial examination shows that some of these latter occur much more frequently than the others. We cannot devote space to the consideration of all the minerals found abundantly in rocks, though we shall attempt to describe the more important of

them that enter into materials of construction, and other substances with which the architect has to deal. Foremost amongst these are two of the Silica group—quartz and flint.

Quartz crystallises in the hexagonal system, its common form being hexagonal prisms terminated by hexagonal pyramids; has practically no cleavage; is colourless when pure, and usually transparent, like glass; fracture, conchoidal; lustre, vitreous; hardness, 7; specific gravity, 2·5–2·8; chemical composition, silicon=46·67, oxygen=53·33 per cent. Quartz enters very largely into the composition of many igneous, aqueous and metamorphic rocks, but the crystalline boundary lines of the mineral are not often clearly shown, especially in the thoroughly crystalline varieties where the minerals have not had an opportunity of crystallising out freely. Probably, the most perfect quartz crystals are found lining cavities in rocks. Fragments of the mineral, derived from the destruction of the crystalline rocks, form the bulk of many aqueous. The student will readily distinguish quartz, in building stones, from its white, transparent, or smoky appearance, and by its hardness; it cannot be scratched by a steel penknife.

Flint is another variety of silica, differing from quartz in that it does not assume any crystalline form, is not so pure, and presents a dull leaden or black colour. It occurs as nodules and tabular masses in aqueous rocks, particularly in the upper portion of the Chalk formation, and is much used in the east and south-east of England for building purposes and road-metal. As minute particles, it frequently contributes to the substance of certain fragmental rocks.

The minerals of the Felspar group next claim our attention. They are essentially silicates, containing alumina, together with potash, soda and lime, following the various kinds. Iron is occasionally present. Of the numerous species composing the group, we need only mention orthoclase and oligoclase.

Orthoclase felspar crystallises in the monoclinic system; cleavage planes usually very apparent; colour, variable, but mostly white, pink, or red in building stones, semi-transparent, or opaque; chemical composition, silicate of alumina and potash, often with small proportions of soda, magnesia, lime, iron, or manganese; hardness, 6; specific gravity, 2·39–2·62. It occurs as a common constituent of many plutonic and of certain metamorphic rocks.

Oligoclase felspar crystallises in the triclinic system; cleavage, perfect; colour, grey, light green, white, or yellow; chemical composition, silicate of alumina and soda, sometimes also small proportions of potash, lime, iron, and manganese; hardness, 6; specific gravity, 2·58–2·7. The felspars crystallising in the triclinic system are known generally as *plagioclase*. The variety now under discussion frequently occurs in igneous rocks, both plutonic and volcanic, as well as is some of the metamorphic.

Neither orthoclase nor oligoclase occurs in aqueous rocks except as fragments derived from the igneous and metamorphic. In the latter they are frequently found in company with quartz, and the student will have no difficulty in recognising the larger crystals of orthoclase by comparison. Its milky-white or opaque-red appearance, together with the circumstance that it can be scratched with the point of the knife, readily distinguishes it from the transparent-white, or smoky and harder mineral, quartz. The minute crystals of orthoclase, and oligoclase generally, are more difficult to determine, and the microscope is requisitioned therefor. It is useful to be able to distinguish the difference between these two felspars, because in building stones, oligoclase usually weathers more rapidly than orthoclase.

The decomposition of felspars has provided two rocks of great importance commercially, viz., kaolin, or china-clay, and clay such as is used for brickmaking, though the latter rock has been modified by the addition of other mineral matter.

ARCHITECTURAL ASSOCIATION ANNUAL EXCURSION.—Among the places to be visited on the annual excursion of the Architectural Association (which starts on August 14) will be, as far as the programme is decided, South Lopham, Quiddenham Park, Wilby, New Buckenham, Nole, Rodenhall, Thelveton, Ipswich, Helmington, Brome church and hall, Wingfield castle and church, Putham (churches of St. Mary the Virgin and St. Mary Magdalene), Framlingham, Earls Soham, and Flemming's Hall. The consent of all the owners of places has not yet, we believe, been obtained, but that we hope may be considered a matter of form only.

GENERAL BUILDING NEWS.

ST. PETER'S CHURCH, STAINES.—The foundation-stone of St. Peter's Church, Staines, illustrations of which appeared in the *Builder* on June 24 last, was laid by Lady Clarke on Saturday afternoon last. The church is the gift of Sir Edward Clarke, Q.C., M.P., and the work is being carried out by Messrs. Goddard & Sons, of Farnham, from the designs and under the superintendence of Mr. Geo. H. Fellowes Prynne, the architect.

EXTENSION OF BROMSGROVE SCHOOL, NEAR BIRMINGHAM.—Lyttelton House, in connexion with the extension of Bromsgrove School, was opened by Viscount Cobham on the 12th inst. The new premises adjoin the old buildings, forming with the latter three sides of a quadrangle. The elevations are in red brickwork, with grey local stone dressings, the latter being freely used in the windows, string-courses, and copings of the parapets and gables. The roofs are covered with Broseley tiles. The east wing contains on the ground floor a library and two large sitting-rooms for the use of the junior boys, while over them are three dormitories. On the north side of the quadrangle are eight studies, a drying-room, lavatory, bath-room, and matron's rooms. Mr. Lewis Sheppard, of Worcester, was the architect, and the works have been carried out under his supervision by Mr. Jonathan Brazier, builder, Bromsgrove.

PARISH HALL, RYTON, DURHAM. On the 12th inst. the Bishop of Durham laid a memorial stone of the new parish hall which is being built at Ryton. On the ground floor of the building there is to be a hall, 65 ft. by 30 ft. On the basement, accommodation will be made for class-rooms, kitchen, conveniences, and heating chamber. The material used is stone, from Messrs. Lishman (the contractors for the work), quarry at Blaydon. The timber, plumbing, and glazing are by Mr. Tweedy, of Ryton. The architect is Mr. Crawford Hicks, of Newcastle. The total cost of the new hall, exclusive of furniture, will be 1,300*l*.

WESLEYAN CHAPEL, MORLEY, YORKSHIRE. On the 15th inst. the memorial-stones of a new Wesleyan chapel and Sunday-school at Bank's-hill, Morley, were laid. The chapel will be in the Classical style, and the work of erection will be carried out under the supervision of Mr. T. A. Buttery, of Morley, the architect. There is a schoolroom on the basement, around which there are seven class-rooms. Above this is the chapel, which will provide accommodation for 600 adults. The total cost will be about 3,200*l*.

TAUNTON NEW CHURCH, MORLEY, YORKSHIRE. The present church at Morley, which has been built some twelve years, being found to be much too small for the quickly-increasing town, it has been decided to build a new church, using up as far as possible the material of the old building. Designs have been prepared by Mr. Geo. H. Fellowes Prynne, of Westminster, and the contract for the nave and transepts has been undertaken by Messrs. Sugden Bros., contractors, of Morley. The total cost of the church, with chancel, vestry, and baptistry complete, will be about 18,000*l*.

RESTORATION OF KINGSTON CHURCH, DEVONSHIRE.—On the 13th inst. Kingston Church, near Bigbury Bay, Devonshire, was re-opened after restoration. Twelve months ago, says the *Western Morning News*, the church was in a deplorable state of decay, and in danger of collapsing. All the timber work was rotten, the north wall was 18 in. out of the perpendicular, and the barrel roofs, when stripped of the plaster, crumbled to pieces with decay. Plans for the restoration of the edifice were prepared by Mr. Edmund Sedding, architect, of Plymouth, and have been carried out by Mr. J. Lukecraft, of Aveton Gifford, and Mr. W. Triggs, of Kingston. The north wall has been entirely rebuilt, and an unsightly modern vestry attached to it removed. The arcade has been made upright, the plaster removed, and the walls pointed. New roofs have been constructed, with curved ribs of oak in the nave and chestnut in the north aisle. By the removal of the vestry a three-light window has been opened out, and a new three-light traceried window of granite has been inserted in the east end of the north aisle. All the other windows have been repaired and filled with cathedral glass. The building has been re-roofed, and chairs substituted for the high pews. In the chancel a pavement of coloured tiles has been laid, with steps of granite. The total cost of the work has been about 1,000*l*. During the restoration interesting fragments of the original building were rescued, and great care has been taken as far as possible to preserve them intact. Buried in the west wall of the tower was discovered a Decorated window of the fourteenth century. Several jambs found in the two westernmost windows of the south wall are of thirteenth-century date, and are the earliest features in the church. Fragments of the old churchyard cross were found buried in one of the walls, and these will be carefully restored.

BAPTIST SCHOOLS, WORCESTER.—The memorial-stone of new Baptist schools in St. Martin's-gate, Worcester, has just been laid by Miss Binyon. The schools are being erected on a site adjoining the boys' present school, and are for girls and infants. The infants' school, on the ground floor, will be 69 ft. long and 20 ft. wide, with babies' room and

class-room. The girls' school, on the first floor, will be 50 ft. long and 20 ft. wide. Three class-rooms, providing accommodation for 248 infants and 226 girls, are to be erected. There are to be separate entrances from Bowling-green-terrace for the girls and infants, and cloak-rooms and lavatories for each. There is to be a separate staircase from the girls' school and class-rooms. The schools will be heated by hot water. The materials to be used are red bricks for walls, with moulded brick strings, &c., and roofs covered with tiles. The floor of the infants' school and class-rooms will be laid with wood blocks, and the girls' schools and the class-rooms boarded. Messrs. Bromage & Evans are the builders, and Messrs. Yeates & Jones, of Worcester, are the architects.

CHANCEL, ST. THOMAS'S CHURCH, SEAFORTH.—On the 11th inst. the Bishop of Liverpool laid the memorial stone of the new chancel to St. Thomas's Church, Seaforth. The principal dimensions inside the walls will be 36 ft. 6 in. in length, by 23 ft. 6 in. in width. On the north side there will be a new organ chamber, immediately adjacent to the present choir vestry. There will be accommodation in the new chancel for a choir of thirty men and boys, the clergy having separate stalls. The choir stalls will be of oak. The chancel floor will be raised 2 ft. above the floor of the nave, and will be laid with wood block flooring. The floor of the sacrum will be laid with glass mosaic. On the south side of the sacrum there will be a sedilia for three clergy and credence table; on the north side, the bishop's chair, and priest's door leading into the choir vestry. The chancel wall will be of red stone, with wrought-iron grille on top. It is proposed to move the pulpit from its present position to the north side of the chancel. There will be additional accommodation in the nave and old organ chamber for eighty. A porch will be built for the choir vestry. The materials used are grey brick for the exterior, with terra-cotta tracery to the windows, sedilia, chancel, and organ arch, also all doorways. There will be a three-light window over the altar, and windows north and south of the chancel. The contractor for the work is Mr. Isaac Dilworth, of Wavertree, the architect being Mr. Charles Aldridge, of Liverpool.

PROPOSED EXTENSION OF EDINBURGH FEVER HOSPITAL.—On the 4th inst., at a meeting of the Public Health Committee of the Edinburgh Town Council, a report was submitted by the Fever Hospital sub-committee recommending general approval of a block plan of the proposed additions and alterations on the City Fever Hospital prepared by the City Superintendent of Works. The probable cost is set down at 50,000*l*. The Committee resolved to recommend general approval of the plans to the Magistrates and Council, and to crave a remit, if the plans are approved, to prepare plans and specifications, and to obtain estimates for the work. If necessary the additions can be carried out by degrees, so that the whole expenditure does not necessarily require to be sanctioned at once. The formation of the ground, it seems, is responsible for the heavy cost, the slope to the Cowgate necessitating the construction of retaining walls. The plan shows a series of detached pavilions or isolated wards, the intention of the architect being to have the different diseases kept apart and practically in separate buildings. *Scotsman*.

TECHNICAL SCHOOLS, MAIDSTONE.—On the 6th inst. the Mayor of Maidstone laid the foundation stone of the new Technical Schools of Science and Art. The building will form the west and north-west wing of the present Museum buildings. In the basement are engine-room and workshop for electric lighting and experiments, heating apparatus, and storage. On the ground floor are entrance hall, library, physical science lecture room, lecturer's preparation room, and students' laboratory, wood-carving shop, chemical laboratory, balance room, and lecturer's preparation room, large lecture room, science class rooms, master's room, and store for apparatus. On the first floor there are landing and upper hall (forming picture gallery), committee room, art master's room, elementary art class room, life studio and dressing room, painting room, antique studio, modelling room and cast store. At the studios have north or north-east light. The entrance hall is in communication with the Museum. The building is designed as part of a plan for the extension and completion of the Museum on the lower side, by building a new curator's house at the extreme west end, fronting St. Faith-street, and erecting an extension of the art wing of the Museum on the site of the present house. This will form a second fore-court, of which the school entrance will form the north, and the curator's house and new museum wing the west and east flanks respectively. The designs have been prepared by Mr. Albert W. Smith, F.R.I.B.A., of the firm of Messrs. Ruck & Smith, Maidstone. The contract for the building has been taken at the sum of 6,867*l*. by Messrs. Wallis & Sons, and that for the plumbing by Mr. H. Brennan, at 84*l*.

ENLARGEMENT OF SCHOOLS, ILLINGWORTH, YORKSHIRE.—On the 15th inst. the memorial stone was laid in connexion with the enlargement of St. Mary's Church Sunday Schools, at Illingworth. In the present, together with the caretaker's house and kitchen, together with two large class-rooms. Ascending to the room above, which is on a level with

the ground floor of the present school, there is to be an assembly-room, and the present building will be divided into four class-rooms. The whole work will entail a cost of about 1,500*l*. Messrs. Horsfall & Williams, of Halifax, are the architects, and the tenders of the following Halifax firms have been accepted for the carrying out of the work, viz.:—Mr. Edwin Naylor, mason; Mr. Joseph Halliday, joiner; Messrs. Blackburn & Davenport, plasterers; Messrs. Murgatroyd Bros., painters; plumber, Mr. Boocock.

PROPOSED CHURCH WORK, LIVERPOOL.—Chancellor Espin, D.D., held a consistory court for the diocese of Liverpool in the vestry of St. Nicholas's Parish Church, on the 18th inst., when faculties were granted as follows:—For the erection in the chancel of St. Nicholas's, Blundellsands, of a reredos of oak, with carved figures representing in the centre "Christ as the Good Shepherd," and in the side panels, Christ's love and power shown in His blessing little children and raising the dead. The cost of the reredos, between 300*l*. and 400*l*., will be defrayed by Sir William B. Forwood.—The Rev. R. F. Herring, vicar of St. John the Baptist, in Toxteth, made application to remove the present altar, and to substitute a new one of carved oak; and also to form a side chapel by opening an entrance to the south vestry through the wall of the south transept. The new altar for the church is being prepared according to a design of Messrs. Woolfall & Eccles, architects, of Liverpool.

CONGREGATIONAL CHURCH, STROUD GREEN.—On the 13th inst. the foundation-stone of the Mount View-road Congregational Church, Stroud Green, was laid. The estimated expenditure on the new church will be about 9,000*l*. The new church will be built of red brick, faced with terra-cotta, and will have a tiled roof. The underground hall, parlour, and class-rooms, which the slope of the land rendered advisable, will not be furnished for a time after the church is completed. The building is designed to seat 1,000 on the ground floor and in the galleries, which will run round three sides of the church. The architects are Messrs. Beaumont, of Watling-street, and Mr. W. Shepherd, of Bournemouth, is the builder.

NEW Y.M.C.A. BUILDINGS, PAIGNTON.—On the 19th inst. the foundation-stone of new buildings for the Paignton Young Men's Christian Association was laid by Mr. O. S. Bartlett, Chairman of the Local Board. The plan of the building comprises a reading-room 28 ft. by 27 ft., games-room 22 ft. by 24 ft., committee-room, music-room, class-room, and gymnasium 40 ft. by 20 ft. There will be three stories, and the ground floor will be occupied as shops. The cost of the building is estimated at 1,600*l*. Mr. W. G. Coudrey, of Paignton, is the architect, and Messrs. C. and R. E. Drew are the builders.

MISSION CHURCH, LONG HANDBOROUGH, OXFORD.—On the 15th inst. the Duke of Marlborough laid the foundation-stone of a mission church at Long Handborough. The building will have accommodation for about 200 persons. It will be 46 ft. in length, and 22 ft. wide, with a chancel 21 ft. by 15 ft., and there will be a vestry which is intended to use for classes. Local stone, rock-faced, will be used, with Bath-stone dressings for the windows, &c., and the roof will be of open timber and slated; at the west-end there will be an open oak-framed porch with a bell turret, and the building throughout will be warmed with Forrit's hot-air apparatus. The architect is Mr. E. H. Lingen Barker, of London, and the builders are Messrs. Giles & Son, of Kenilworth.

COTTAGE HOSPITAL, WILLESDEN.—On the 18th inst. a new cottage hospital was opened in Harlesden-lane, Willesden. The building has been erected from designs by Messrs. Newman & Newman, architects, of London.

BLACKPOOL TOWER.—Messrs. Maxwell & Tuile, architects of the Blackpool Tower, report that the building is now practically completed up to the level at which the lifts land. The whole of the work is made to the very top, and has been erected in Messrs. Heenan & Froude's yard at Newton Heath. Plans at the present time are before the Building Plans Committee of the Town Council for the erection of a large restaurant capable of seating 700 people at once, and for a large new assembly hall with two heights of galleries and stage for entertainments and orchestra.

TOWN HALL, KENDAL, WEST-MORELAND. On the 6th inst. the foundation-stone of the new Town Hall, Kendal, was laid by Mrs. Bindloss. The architect of the building is Mr. S. Shaw, of Kendal.

WESLEYAN CHAPEL, SPOTLAND, LANCAASHIRE.—On the 15th inst. the corner-stones of a new Wesleyan school-chapel in Silver-street, off Spotland-road, were laid. The new chapel, which is to accommodate 250 persons, will be supplied with class-rooms, and is estimated to cost about 800*l*. Mr. Edgar Wood, of Middleton, is the architect, and Mr. Kay the contractor.

EXTENSION OF THE CITY OF LONDON COURT.—The foundation-stone of the extension to the City of London Court was laid on the 17th inst. by Mr. J. Tickle, Chairman of the Law and City Courts Committee. According to the *City Press*, the superficial area of ground to be covered by the new structure is about 1,420 ft., having a frontage to Basinghall-street of 28 ft. There will be four floors.

including a basement, and each floor will be at the same level as the corresponding floor of the present building. The accommodation on the ground-floor will be thrown into the office at present used by the clerks in the Registrar's department. It will not be necessary to do any pulling down to form the connexion between the new and the old building, as arched openings already exist, and only require to be opened out. The first floor, which is on the same level as the Courts, is to accommodate the Registrar, while the counsel and solicitors who practise at the Courts are to have rooms set apart for their own use. Accommodation is to be made for a resident housekeeper on the second floor of the additional premises, the basement being used for the storage of records and books. The style of the new work will match the existing building, which is early fifteenth-century Gothic. The windows to the ground and first floors next Basinghall-street will have cusped heads. The floors throughout will be made fire-resisting with coke-breeze concrete carried on rolled-iron joists. The contract is in the hands of Messrs. E. Lawrence & Sons, builders, and the estimated cost is 5,280*l*. The architect is Mr. A. Murray, A.R.I.B.A., the City Surveyor, who also designed and superintended the erection of the present Court-house.

PUBLIC HALLS, EDINBURGH.—At a meeting of the Plans and Works Committee of the Edinburgh Town Council, on the 20th inst., the estimates for the new public halls at Dalry were accepted, the amount being 8,000*l*. The plans are by Mr. Morham, City Architect.

EXTENSION OF NEWPORT INFIRMARY.—According to the *Western Mail*, the new wing added to the Newport Infirmary is nearly completed. The new wing has been built by Mr. Edwin Richards, from plans by Messrs. Habershon & Fawcett. It will be known as the Port Ward, and will provide accommodation for the nurses and for patients, bringing the total number of beds in the institution up to sixty-seven.

WESLEYAN SUNDAY SCHOOL, NORTH SHIELDS.—On the 12th inst. the memorial stones were laid of a new Wesleyan Methodist Sunday School in North Shields. The main building, which is to be utilised as a Sunday school or lecture hall, will be 51 ft. long by 30 ft., having transepts at the northern end separated from it by revolving shutters which will be used as class rooms; these are 17 ft. wide by 16 ft. deep. In like manner the infant school, to the north of the hall (24 ft. long by 19 ft. wide) is separated by revolving shutters. The accommodation thus afforded is 200 children in classes in the hall, forty in each of the class rooms, and eighty in the infant school. There are two entrances to the hall. An additional room is obtained over the infant school, and accommodates eighty persons. Access to this is obtained by a staircase at the side of the infant school, which also gives access to the yard on the ground floor, in which are placed the requisite outbuildings. In the north-east corner of the site but attached to the school buildings, is a house for the church officer. In the basement of the school is placed the heating cell. The hall presents a gable to the south, with two three-light trefoiled headed windows in the lower part, separated by a buttress, with ornamental weatherings, and a large circular window above with tracery. A large circular corridor to the church porch has a pointed double moulded arched entrance. The other elevation (east) presents a double gable to Drummond-terrace, with moulded arched doorway on ground floor; in the higher one the side walls and class room gable contain numerous windows. Internally the lecture hall has an octagonal pillar beam roof with wrought iron principals. It is 13 ft. 6 in. high at the side walls, and 21 ft. in the centre part. The platform at the north end is constructed so as to give a gallery over it, supported on wood posts with open rails. The whole of the buildings have been contracted for by Mr. T. W. Wier, of Howdon-on-Tyne. The design for the buildings has been furnished, and the work is being carried out under the superintendence of the architect for the church (Mr. F. R. N. Haswell F.R.I.B.A., of North Shields).

SANITARY AND ENGINEERING NEWS.

NEW WATERWORKS, DENBY, YORKSHIRE.—The new waterworks at Denby, Yorkshire, have just been completed. The reservoir has a capacity of two million gallons, and is 738 ft. above sea-level. A service reservoir with a capacity of 100,000 gals. has been made in Rusty plantation, 993 ft. above sea-level. About five years ago the Local Board made a small service reservoir at Most Holme, previous to which the whole township was supplied by water from pumps and wells. The population provided for in the supply is 1,750, and the total cost of the scheme is about 5,500*l*. The works have been constructed by Messrs. Abbott Brothers, Denby Dale, under the supervision and upon plans prepared by Messrs. G. & G. H. Crowther, engineers, Huddersfield.

NEW VIADUCT AT BONARRIDGE, N.B.—On the 7th inst. the new viaduct over the Kyle of Sutherland, at Bonarbridge, was opened by Lady Ross of Balnagown. The old Bonar Bridge, which was erected by Telford in 1810 over the Kyle of Sutherland, at the head of the Dornoch Firth, was

carried away by a flood on January 29 of last year. The old bridge was very narrow, having a width of only 15 ft., and with very steep gradients rising to the centre of the largest span, which consisted of two masonry arches of 50 ft. and 60 ft. span respectively, and one cast-iron arch of 150 ft. span and 230 ft. limit. The tender of Sir William Arrol & Co., Limited, Dalmarnock Ironworks, Glasgow, was accepted for the new bridge, the amount being 12,584*l*. 17*s*. The new bridge has three spans of 70 ft., 105 ft., and 140 ft. respectively, with a clear width of roadway of 25 ft., and an even gradient of road of 1 in 100 in place of the steep inclines on the old structure, and a total width of available waterway of 315 ft., as against 260 ft. in Telford's bridge. The west or Ross-shire abutment is carried down to a bed of hard gravel, and the masonry commenced on a thick bed of concrete, while at the east or Sutherlandshire abutment the masonry rests on the solid rock. The masonry framework is of Rogart granite, while the quoins are of red granite from Corriennie Quarry in Aberdeenshire. The masonry part of the contract, being chiefly granite, was sub-let to Mr. John Fyfe, of Aberdeen. The piers are founded on cylindrical steel caissons, sunk by the pneumatic process to a bed of hard gravel, the position of the No. 1, and to the solid rock in the case of pier No. 2. The superstructure consists of bowstring girders, with overhead bracing at the 140-ft. span, and numerous side stiffeners on all the girders; and the flooring is of troughs built up with Z bars and plates, rivetted to the top flanges of the cross girders and joined with curved plating. This roadway proper is laid with granite cubes bedded on sand, while the footpath is formed with Caithness pavement. A parapet of steel lattice work runs the whole length of the bridge on the inner side of the main girders, and ornamental scrolls fill in the angles between the sides of the pilasters and the curved upper boom of the main girders. Messrs. Crouch & Hogg, of Glasgow, were the engineers of the bridge.

PROPOSED NEW TYNE BRIDGE.—It is proposed to erect a new bridge across the Tyne, from the foot of Pilgrim-street, Newcastle, to Church-street, Gateshead. In a report prepared by Messrs. Sandeman & Moncrieff, engineers, of Newcastle, it is stated that, with regard to the position of the bridge, the most favourable site is that shown on the plan prepared by the late Mr. Hubert Laws. The most suitable and economical type of bridge would be that of a cantilever bridge. The bridge would comprise a central river span of 500 ft. between centres of piers, approached by two spans of 150 ft. each on the Newcastle side, and two spans of 85 ft. across Church-street on the Gateshead side. The proposed bridge would have a central main roadway of 30 ft. width, suitable for a double line of tramways, and room to pass for vehicles, and two footpaths, 10 ft. wide, on each side of the main roadway. The estimated cost of the construction of the bridge, exclusive of cost of land and buildings, is about 125,954*l*.

PROPOSED SEWAGE WORKS, RAMSBOTTOM, LANCASHIRE.—On the 18th inst. Colonel Ducat, R.E., attended at the Local Board offices, Ramsbottom, to hold an inquiry into the Board's application to the Local Government Board for sanction to borrow 30,000*l*. for the purposes of sewage within the Board's district. Mr. Nuttall, engineer to the scheme, gave particulars of the proposed treatment of the sewage. At the close of the inquiry the Inspector, accompanied by members and officials of the Board, drove to the site of the proposed sewage works at Summerseat.

WATER SUPPLY, WOTTON-UNDER-EDGE. The Dursley Sanitary Authority (who were supported by the recommendation of the Parochial Committee and of a largely-attended meeting of ratepayers) having applied to the Local Government Board for permission to borrow the sum of 3,000*l*. to carry out a scheme for supplying the town with water, Mr. Thomas Codrington recently held an inquiry in relation thereto at the Town Hall. Mr. Wenden, Clerk to the Authority, read the notice convening the meeting. Mr. Peters, agent to Lord Fitzhardinge, stated that the conditions under which his lordship gave the water were that sufficient should be left for the level, and that it should be confined to the area laid down in the present plan. Mr. Peters having pointed out to the Commissioner the lands owned by Lord Fitzhardinge, Mr. A. P. I. Cottrell, A.M.Inst.C.E., of Bristol, engineer to the scheme, explained the details of the plan, and answered a number of questions put by the Commissioner as to the levels, and more particularly as to the area laid down and the yield. The lowest reading was 28 gals. per minute, or over 40,000 gals. per day, from the sixteen springs at Hamlin Brake, exclusive of the springs at what is known as Weetfield. Dr. Joynes answered a number of questions as to the lack of water in the upper part of the town. Afterwards Mr. Chatter gave a vote of thanks to the Commissioner for the courteous way in which he had carried out the inquiry. The Commissioner, Mr. Cottrell, Mr. Wenden, Mr. Henley, and others, afterwards visited Hamlin Brake, and it was generally understood that the scheme, subject to some amendment, would be accepted by the Local Government Board.

EXTENSION OF HARBOUR, DOVER.—On the 20th inst. the Prince of Wales laid the memorial stone of

the works in connexion with the extension of Dover Harbour. The works designed for the formation of the Outer Harbour consist of an extension of the Admiralty Pier, 580 ft. in length, to form the western arm, and of an entirely new work—the East Pier (the first stone of which was laid by the Prince), intended to give shelter from the east and south-east. The memorial stone will form part of the approach to the East Pier. From a point directly seaward of the stone, an iron conduit 260 ft. long, will be constructed, the deck-level being 19 ft. above high water. The remaining portion of the pier will be of solid masonry and 1,500 ft. in length, curving towards the south-west. The entrance between the head of the East Pier and the end of the Admiralty Pier, when extended, will be 450 ft. in width. When completed the sheltered area of the new harbour will be 56 acres, one half having a depth of three to six fathoms at low water. The works include the reclamation of a considerable portion of land on which two railway jetties will be constructed, and alongside which four steamers can be berthed. Messrs. Coode, Son, & Matthews are the engineers for the new East Pier, the contract for being Mr. John Jackson, whose contract is for 19,000*l*. The extension of the Admiralty Pier and the railway jetties will not be undertaken at present.

FALLSWORTH SEWAGE SCHEME. An inquiry was held by Colonel M. Ducat, R.E., Local Government Board Inspector, on the 19th inst., at the offices of the Fallsworth Local Board, for application to the Local Board to borrow 30,000*l*. for the purposes of works for sewage disposal. The chairman of the Local Board, and most of the members were present, together with the Board's Solicitor, Clerk, and Surveyor. Mr. C. I. Lomax, Surveyor and Engineer, explained the scheme, which he said was based upon experience gained in dealing with the sewage of other towns. A distance of about 200 yds. was required for the purposes of works for sewage disposal, and the scheme was one that might be considered of a permanent character. It was proposed to lay tributary and main concentrating sewers to collect the whole of the sewage and carry it to one outfall, where, after being precipitated in tanks, it would be passed through pits, and there have been practically no opposition, and the inquiry terminated, the inspector subsequently visiting the proposed site.

WATER SUPPLY OF DUNKERQUE.—According to a recent report of the British Consul at Dunkerque, the new water supply of that town is brought in iron pipes from springs at Houille, in the Pas de Calais, a distance of about 20 miles. The water is good, and there is a considerable number of taps in the town from which water may be taken gratuitously. The price to consumers supplied in their own houses by meter varies from 4*d*. to 86*d*. per cubic yard, according to quantity taken, up to 38.166 cubic yards. For all water over that quantity the price is 86*d*. per cubic yard. The minimum charge is 1*l*. 4*s*. a year for 38.166 cubic yards.

STAINED GLASS AND DECORATION.

MEMORIAL WINDOW, PEEBLES PARISH CHURCH.—A stained glass memorial window has been placed in Manor Parish Church, Peebles, dedicated by Archibald Hewat, Edinburgh, to the memory of his mother and to his grandfather. The subject chosen for illustration is that of the visit of Mary Magdalene and Mary the Mother of James to the tomb of Christ on Easter morning. The window is from the studios of Messrs. A. Ballantine & Gardiner, Edinburgh.

RE-DECORATION OF THE PARAGON MUSIC HALL.—The Paragon Theatre of Varieties, Mile-end, is being redecorated throughout by Messrs. Campbell Smith & Co., of Newman-street, Oxford-street. The electric lighting arrangements and the preparations for heating the theatre will be carried out by Messrs. Vaughan & Brown. The architect is Mr. Frank Matcham.

MEMORIAL WINDOW, ST. SAUVOUR'S CHURCH, HERNE HILL, LONDON.—To perpetuate the memory of their late vicar, the Rev. L. T. Chavasse, M.A., the worshippers at St. Saviour's Church, Herne Hill-road, Camberwell, subscribed for a stained glass window, which was recently unveiled by Mr. Alfred Lafone. The subject of the window is from the Parable of the Ten Talents, bearing the words, "Well done, good and faithful servant." The window was designed and executed by Messrs. A. L. Moore, of Southampton-row, W.C.

FOREIGN AND COLONIAL.

FRANCE.—M. Terrier, the Minister of Commerce, officially opened last Saturday the "Exposition Internationale de Progrès" at the Palace de l'Industrie. —M. Chédanne, the architect whose explorations at the Pantheon have attracted so much attention, has received the decoration of the Legion of Honour. —The Municipal Administration of Paris has given its confirmation to a project by M. Humbolt for bringing the waters of the rivers Loing and Lunain to Paris. The addition of these new sources, which will necessitate an outlay of twenty-nine million francs, will provide for an increase of 60,000 cubic metres a day in the Paris water supply. —The Government has pronounced the declaration of "Utilité Publique" in favour of a scheme for forming a new basin in the port of Marseilles, to the north

of the "bassin national," at an estimated expense of twenty million francs.—The jury of the competition opened at Confians-Saint-Honorine (Seine-et-Oise) for a new Hotel de Ville and a group of schools, has awarded the first premium to M. Theophile Bourgeois, architect, of Poissy; the second to MM. Girod and Hennequin, of Paris; and the third to M. Flamant, of Paris.—The new maritime canal at Nantes was opened on Sunday last.—In the railway station at Nîmes there is to be put up a bust of M. Paulin Talabot, the founder and director of the Paris, Lyons, and Mediterranean railway system.—The "Société des Architectes de l'Aisne" has organised a committee for the erection, at Ribemont, of a monument to François Blondel, Seigneur de Gullard, the celebrated French architect, who was born at Ribemont in 1677 and died at Paris in 1685.—The death is announced, at Fourchambault, of M. Alfred Saglio, mining engineer, and director of the foundry at Fourchambault. He was the brother of M. Saglio the new curator of the Cluny Museum.—The death is also announced, of M. Fonfaye de la Prandie, architect, former pupil of MM. Pacard and André. In his latter years he had devoted himself to engraving under the direction of M. Charles Courty, and gained in this department an honourable mention in the Salon of 1889.—The Municipal Administration of Paris recently opened a competition between a certain number of painters for the decoration of the new Salle des Fêtes in the Marne of the XI^e arrondissement. This limited competition, having given satisfactory results, a new one is to be opened shortly.—The Municipality of Paris has authorised the "Société Nationale du Souvenir Français" to erect on the Place Vauban, behind the Ecole Militaire, a monument to the memory of soldiers and sailors who have died in the service of France. The design for the monument is to be submitted to the approval of the Municipal authorities.

MISCELLANEOUS.

REVEREND, ST. ANDREW'S CHURCH, EAST ALLINGTON, DEVONSHIRE.—In addition to the western window, Mrs. Cubitt, widow of the late William Cubitt, of Falkpit, has just erected a reredos in the sanctuary of St. Andrew's parish church, East Allington, together with altar and altar rails. The present works were designed by Mr. E. L. Parsons, the architect, and carried out in the studios of Messrs. Harry Hems & Sons, of Exeter. The reredos picture depicts the subject of the fifteenth-century window above, and its fabric is carried out entirely in veined and polished alabaster. Wings of the same material, consisting of a double arcading, one above the other, extend from it to the north and south walls. This work is also returned on each side, continuing westward as far as the new carved oak altar rails, where it again returns north and south, and is again returned Gothic character. Above the super-altar, a new one is to be erected, in which a representation of the Crucifixion is carved in high relief. Divided by ornamental buttresses, which terminate amidst foliage above in crocketed pinnacles, are four groined and canopied niches, two on each side. In these are statues of SS. Matthew, Mark, and Luke, as well as of St. Andrew. All the sculpture is in pure white Castellani marble. On the north side a credence table has been placed, also in polished alabaster, with a foliated cross of Castellani marble let into its shelf. The altar rails are, like the new altar, of well-seasoned oak, and carved. They also are by Messrs. Harry Hems & Sons.

A MUCH-NEEDED IMPROVEMENT.—At the meeting of the Strand Board of Works on Thursday, Mr. George Cox, in moving the adoption of the Works Committee's report, stated that a letter had been received from Messrs. Clutton, applying on behalf of the Ecclesiastical Commissioners for leave to widen and improve Chichester Rents, Chancery-lane. He might mention that Chichester Rents is at present a narrow court with crooked frontages, and entered from Chancery-lane by an archway about 4 ft. wide and 20 ft. long. It is now proposed to throw the whole of the court open and to make it of a uniform width of 11 ft. with straight frontages. The Committee are of opinion that the alterations proposed will, if carried out, be a great improvement to Chichester Rents and an advantage to the public, and accordingly recommend that the Board's assent to the proposed improvement be given. He added that there were certain precedents, and with these the Commissioners were prepared to comply, such as that the necessary paving works be carried out at the expense of the applicants. The report was adopted, and a general opinion expressed that a much-needed improvement in Chancery-lane would by this means be carried out by the Ecclesiastical Commissioners.

NEW CLOCK AT YORK.—Messrs. Makins & Sons, drapers and silk-mercers, Parliament-street, York, have placed a large illuminated clock on the front of their premises in that thoroughfare, which hitherto has been without a public clock. The work has been executed by Messrs. Wm. Potts & Sons, clock manufacturers, of Guildford-street and Cockridge-street, Leeds.

ROYAL ACADEMY ARCHITECTURAL SCHOOL.—The following students have been admitted: Upper

School: Messrs. E. W. Marshall, H. Seton Morris, E. A. Pearce, and H. A. Saul. Lower School: Messrs. C. C. Brewer, A. R. Hennell, F. T. Howard Ford, P. Rodeck, J. E. Smales, W. E. Tower, and V. W. West.

BUST OF THE LATE MR. JOHN INSHAW.—Mr. John Roddis, sculptor, of Aston-road, Birmingham, has, we are informed, modelled a bust of the late Mr. John Inshaw, C.E., inventor of the twin-propeller, who died a few months ago, for the deceased gentleman's friends.

PARTNERSHIP.—We are informed that Mr. William Mallinson, timber and veneer merchant, 136 and 138, Hackney-road, N.E., has admitted into partnership Mr. James Richardson (his late manager), and that the business will be carried on as heretofore, except that the name of the firm will be William Mallinson & Co.

THE "DUPLEX" CRAMP.—This is an invention by Mr. W. C. Chappell, intended as an improvement upon the present methods adopted in wedging up light sashes, doors, &c., which by unduly forcing the joints on the inside, tend to open them on the outside. Each cramp consists of a pair of double "shoes" which grip the work on both sides of the rail simultaneously, the space between being sufficient to allow for any ordinary sized tenon to project, and for driving the wedges.

LIFTS.—Messrs. Waygood & Co., of London, have received instructions to construct and erect a passenger lift at Balmoral Castle for the use of Her Majesty.

MEETING OF MUNICIPAL ENGINEERS AND SURVEYORS.—Owing to want of space we are compelled to hold over the continuation of the account of this meeting.

SEATS AT HAMPTON COURT.—One of the drawbacks to enjoyment at Hampton Court is the meagre sitting accommodation provided in the grounds, the lack of seats being especially noticeable on a fine Sunday, when the park is filled. Mr. A. C. Morton is in communication with the First Commissioner of Works with the idea of a further provision of seats, and he has also evolved a proposal that a refreshment-stand should be erected within the grounds for the convenience of thirsty and hungry visitors. The reply of Mr. Shaw-Lefevre has not yet been received.—*Pall Mall Gazette.*

CAPITAL AND LABOUR.

THE LOCK-OUT IN THE BLACKBURN BUILDING TRADE.—A conference of the Master Builders' Association and the Blackburn Industrial Federation was held on the 21st inst. at the Devonshire Hotel, Blackburn, respecting the present lock-out in the building trade. The representatives of the men's Federation adhered to their original demands of 3d. advance to the plasterers at once and another 3d. in March next. The masters, however, contend that the present condition of trade will not warrant such an advance, and they decline to grant it. The masters also intimate that all conferences with a respect to a settlement were now at an end, unless the men wish to meet them as to the acceptance of their terms. It is reported, however, that the masters have decided to give work to non-union men, but to continue the lock-out against union men.

THE CARPENTERS' STRIKE IN SHEFFIELD.—Most of the masters in Sheffield have granted the demand of the carpenters and joiners for an increase of a halfpenny in their wages—from 8d. to 8½d.—and the strike is therefore practically at an end.

MEETINGS.

SATURDAY, JULY 20.
British Institute of Public Health.—Congress at Edinburgh (continued).

SUNDAY, JULY 21.
Incorporated Association of Municipal and County Engineers.—Metropolitan District Meeting, to be held at Westminster.

British Archaeological Association.—Opening of Fiftieth Annual Congress, Winchester.

British Institute of Public Health.—Congress at Edinburgh (concluded).

TUESDAY, AUGUST 1.
British Archaeological Association.—Annual Congress, Winchester (continued).

WEDNESDAY, AUGUST 2.
British Archaeological Association.—Annual Congress, Winchester (continued).

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting, 8.30 p.m.

THURSDAY, AUGUST 3.
British Archaeological Association.—Annual Congress, Winchester (continued).

FRIDAY, AUGUST 4.
British Archaeological Association.—Annual Congress, Winchester (continued).

SATURDAY, AUGUST 5.
British Archaeological Association.—Annual Congress, Winchester (continued).

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.
14,868.—**UTILISING WASTE WATER.** *J. Day.*—An automatic timing appliance for closets is the main object of this invention. When one pan is in position the other is filling, so soon as the first is full it discharges its contents, leaving the half-empty one to take its place, which, when filled, is also automatically tilted and emptied.

15,018.—**SCAFFOLD AND LADDER.** *E. Partridge.*—According to this invention a board is held up on a ladder by means of a chain with hooks, which, depending from the top of the ladder, is fastened near the end of the board to a rung or to the sides of the ladder.

15,165.—**DISINFECTING APPARATUS.** *W. A. Wood and another.*—This invention consists of an improved apparatus to be used in conjunction with flush closets. The disinfectant is contained in a small vessel and an air-tube and syphon, arranged so as to supply a small quantity of disinfectant at each flush.

5,588.—**WINDOW-SASH FASTENERS.** *W. N. Cook.*—The fitting which is the subject of this patent is made by two bolts, which work transversely, and can be fixed at either or both sides of the sash.

5,707.—**PORTABLE TERRA-COTTA STOVES.** *T. Roberts.*—To prevent the falling in of the terra-cotta when the stoves are overheated, bolts and screws pass through the cylinders and terra-cotta, uniting them in one compact whole. A disc or plate with extra holes is also fitted to ensure more complete combustion.

6,997.—**GAGE FOR CHIMNEYS.** *R. Scharr (Berne, 2).*—In the present method of building chimneys the walls are often built out of line, that is, in some parts they are narrow and some wide, and pieces of brick and mortar are allowed to project into the chimney. The result of this irregularity in the building is that such chimneys have little or no draught and are very troublesome. To prevent this, an iron cylindrical or oblong gauge is, according to this invention, used, with the sides movable or adjustable by means of a series of cogs or projections. This is built around, and then with a turn of the handle the sides are drawn slightly back and the gauge may be taken out.

10,660.—**TENSION DEVICE FOR SAWS.** *L. Chevenier.*—This invention is a method of simply tightening the frame of bow saws by an arrangement covered by an eccentric lever. It is designed to replace the old twisted cord used for the purpose of tightening the saw frame.

NEW APPLICATIONS FOR LETTERS PATENT.

JULY 10.—13,352, D. Cameron, Scale, Drawing-board, or Block to be used in connexion with the Measuring or Delineating of Buildings and other Structures, &c.—13,386, W. Delrieux, Glass Linting, and a Mosaic.

13,422, P. Clark, Upstairs, 13,423, G. Killick, Heating and Circulating Water, 13,429, D. Morgan, Flushing Stench Traps and other Pipes and Passages, practically applicable to Water-closets and Sinks. 13,431, J. Jack, Preventing Window-shaking Loose or Rattling, 13,464, G. Poore, Dry or Earth Closets—13,479, F. Glass, Hydraulic Lifts and Cranes.

JULY 12.—13,510, L. Motley, Concrete and Metal Earth Block or Plate for Metallic Fencing, Standards, and Posts. 13,514, G. Croker, Gully Traps, 13,521, J. Johnson, Glue Pots—13,524, T. Baker, Window-sash Fasteners—13,543, R. Quine, Chimney Cows or Ventilators—13,558, H. Gregory, Lead Pigments.

JULY 13.—13,575, E. Williams and J. Thomas, Pipe Joints—13,578, W. Hayhurst, Cramps—13,582, W. Beath, Siphon Cisterns—13,593, J. Fisher, Concrete and similar Pavements and Floors—13,612, J. Adlington, Flushing Cisterns—13,616, T. Smith, Joists or Sockets for Soil and other Lead Pipes—13,649, J. Olsen and another, Roofing Tiles.

JULY 14.—13,688, W. Phillips, Self-acting Cupboard Door Fastener—13,693, T. J. J. Cloughton, Ventilators, Soil pipe Terminals, &c.—13,703, T. Ryland and E. Bird, Wood Carving Machines—13,705, J. Schardt, Holders or Clamps for Circular Saws—13,723, R. Muir, Sewer Cleaner—13,740, H. Johnstone and A. Jennings, Window Frames and Sashes—13,794, E. and W. Kingsman, Roofing Buildings—13,795, E. and W. Kingsman, Slates, Tiles, &c., for Roofing and Method of Laying same.

PROVISIONAL SPECIFICATIONS ACCEPTED.

7,397, G. Delalande, Lever Window-fastener, 8,713, G. Lawrence, Sanitary Closet Pan and Automatic Soil Pipe and Drain Disconnector—9,930, J. Renison, New Material for Making Varnish, &c.—10,130, J. Appleby, Ventilators—10,542, J. Collins and H. Rae, Handles for Locks, Latches, &c.—10,647, W. Willis, Silent Action Siphon Flushing Cistern Apparatus, with Improved Valves Working by a System of Leverage from Seat of Water-closet—10,649, J. Hamilton, Concrete and Artificial Stone Mantelpieces—10,658, M. Gentry, Down-draft Smokeless Kilo for Brick Burning and Drying—10,943, W. McCaig, Chimney Cans or Cowl—11,255, J. Ryland, Machines for Carving Wood—11,631, G. Worrell, Door Lock and Night Latches—11,809, I. Melling, Trends of Stairs, Door Steps, Landings, Floors, &c.—11,865, J. and A. Gray, Siphon Cistern for Water-closets, &c.—11,881, M. Miller, Sewer Galleys—12,134, B. Budding, jun., Ventilator or Cowl—12,185, W. Rooke, Ring Sash Lifts, &c.—12,228, J. Banks, Metallic Sheathing or Coverings for Columns and other Structural Parts of Buildings—12,274, H. Flood, Swivelling Doors—12,417, J. Reynolds, Fresh Air Inlet to be Fixed at the Side of Sewer Manholes—12,618, A. Burgess and R. Wilson, Window-sashes—12,643, J. Pearson, Apparatus for Moistening Air and Ventilating Purposes—12,670, F. Snaile, Window Sashes—12,692, M. Negus and J. Stanford, Bakers' Ovens—13,077, S. Wilson, Stoves or Grates.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

13,453, F. Horne, Prevention of Condensation on Windows—10,303, J. Müller, Process for Manufacturing Paint.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

JULY 15.—By Messrs. *Spathman* (at Norwich): 51 a. 2 r. 8 p., "Church Farm," Beighton, part c. and part f. land, 9,955; enclosures of land, 20 a. 0 r. 27 p. 60sq.; five f. cottages, and 1 a. 2 r. 5 p., 165f.; f. marsh land, 19 a. 2 r. 36 p., Rockland St. Mary, 400f.—By Messrs. *Cobb* (at Canterbury): Four enclosures of f. land, 45 a. 1 r. 23 p., near Ramsgate, 179f.

JULY 17.—By *Blake, Haddock, & Carpenter*: "Chart Lands Farm," 74 a. 1 r. 13 p., Limsfield, Surrey, 4,700f. "The Highlands" and 7 a. 2 r. 10 p., Horsham, Sussex, f. 1,960f.; two plots of f. land, 23 acres, Warrington, 450f.; six plots of f. land, 760f.

JULY 18.—By *R. A. Nolley*: 50, Tregunter-rd., Kensington, u.t. 35 yrs. g.r. 16d., r. 90f., 850f.—By *Hollands & Butte*: 20, Charles-st., Hatton, 100f., r. 80f., 1,600f.—By *White, Drue, & Brown*: 1 gr. of 60f., Edgware-rd., &c., Paddington, u.t. 27 yrs., no g.r., 850f.; l.g.r. of 50f. 10d., Cochrane-st., St. John's Wood, u.t. 50 yrs., g.r. 15. 6d., 500f.—By *Field & Sons*: A plot of f. land, Fawcett-rd., Deptford, 80f.; 20, Alpine-rd., f. r. 35f., 385f.; 291, 293, Lynton-rd., Bermondsey, u.t. 44 yrs., g.r. 6f. 6s., r. 88f. 10d., 450f.; f.g.r. of 15f. 15s., Reculver

[illegible]

John James	£723	John Whitewood, Ryde* ..	£66
Eric Barton	660	* Accepted,	

SANDWICH.—For building shop and stores. Mr. E. W. Fry, architect, Dover.—
 Drawn £1 12 0 Richardson £1 0 0
 Brody 1 12 0 Hayward & Parson 1 0 0
 Stiff 1 12 0 Wise, Deal (accepted) 1 0 0

SHEERNESS.—For the extension and alteration of the Marine Town and Blue Town Board Schools, for the Master-in-Chief School Board. Mr. W. Wallace Copland, architect.—
 Laurence Stanger £974 0 0
 George Pavey, Sheerness (accepted) 767 0 0

SHEFFIELD.—For the execution of a scheme of sewage disposal for the village of Ecclefield, for the Worley Union Rural Sanitary Authority. Mr. D. Balfour, engineer, 3, St. Nicholas-buildings, Newcastle-on-Tyne.—
 J. Hill £3 43 0 J. J. Nairn £2 15 0
 C. Green 2 50 0 J. J. Nairn 1 88 0
 Townsend, Wilson, & Carrick 1 58 0
 G. E. 2 50 0 Hall 1 75 0
 C. Hill 2 50 0

SHEFFIELD. For closets, urinals, &c., at Hulseburg Park, Sheffield. Mr. C. F. Wise, City Surveyor.—

C. Skelton £441 0 0 W. H. Addison £250 0 0
 John Morton 407 7 5 5 2 0
 T. Ashforth 388 0 0 467 9 7
 J. Burton 372 9 7 468 9 9
 S. Warton, Manchester* 564 1 0 453 19 0

* Accepted.

STAINES.—For two pairs of cottages to be built in 1 glen Hill, for Mr. Whittington. Mr. R. Pitt, architect, Staines.—
 Gray £386 Robinson & Francis £812
 Reckell 624 Harrison, Staines 665

* Accepted for three pairs, £1,042 10s.

STAINES.—For a block of three cottages to be built in Staines for Mr. C. Reeves. Mr. R. Pitt, architect, Staines.—
 Bent £684 St. Kevelly Staines £749 0 0
 Harrison 875 0 0 Robinson & Francis 738 0 0

* Accepted.

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 Tramey-street, London. Bridge-street.
 Powell £105 0 0 £10 0 0
 Baker 57 11 4 45 5 0

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* Accepted subject to modification.

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The Chicago Exhibition Buildings:
Further Notes.

sketches, p. 3, *ante*). It is the largest covered structure in the world, and occupies a space of 30½ acres.

The southern façade, which has a length of 787 ft., occupies a space immediately opposite the Agricultural Building, on the other side of the grand basin, while the main or longer axis runs north and south for a length of 1,687 ft., and extends into the northern portion of the grounds towards the United States Government Building; it is bounded on the west by the wooded lake. Mr. Post, in making his ground-plan, surrounded his area with a continuous building, consisting of a nave and two aisles, in all about 200 ft. wide. The original intention was then to place in the centre of the inner area thus left a huge dome, which was to be 260 ft. in clear diameter and 160 ft. high, surrounded with two-storied aisles, like the structure going round the outer portion of the site, and which were to be 45 ft. in width.

This scheme had, however, to be abolished in order to find room for the large number of exhibits for which space had to be found, especially as France and Germany threatened to withdraw unless it was conceded. Having these conditions to face, Mr. Post was obliged to abandon the idea of the dome, and he resolved to cover the whole of this internal court with one large unencumbered space, with a span from centre to centre of supports of 368 ft., the largest span of any roof ever erected, and about 6 ft. wider than that of the great Machinery Hall at the Paris Exhibition of 1889. It is also considerably longer, being 1,268 ft. in clear length between the supports. The outer chord of the roof trusses is struck from a radius of 190 ft., which thus gives these great trusses

a form of section which is nearly semi-circular.

The great trusses are spaced on centres of 50 ft., while those to the great roof at Paris were spaced 70 ft. 6 in. apart, centre to centre, and the lattice framing is brought to a point at the base and rests on a steel pin. A similar pin is also used as a connexion at the top of the truss, the height of which is 206 ft., and to the top of the ventilating lantern 245 ft. 6 in., or 61 ft. higher than the Paris example. The roof is hipped at each end, and is covered with a lantern the whole length and round the hips. The trusses near the bottom are 14 ft. in width and 2 ft. 4 in. on face, while towards the top they are narrowed to 10 ft. At the point where the huge hip trusses come they are varied to suit the sweep of the roof, the four corner trusses which, when taken up, become the hip, being set diagonally on plan. The outer flange of the trusses goes up vertically for a height of 100 ft., and the trusses up to this point are connected by three pairs of horizontal trussed girders, and above by lattice-framed purlins on which the light open rafters rest. At the foot of the raised lantern already mentioned, which is carried along the top of the roof, is placed a walking-way about 6 ft. wide, extending round the whole building at this point, and from which a splendid view of the whole Exhibition can be obtained, while across Lake Michigan on the east an uninterrupted view is obtained.

On the ground floor a covered loggia, about 20 ft. deep, surrounds the building on all sides, and the upper gallery to the inside aisles projects inwards between the great trusses at a height of 20 ft. from the ground level. For the purpose of the erection of these great trusses a travelling stage was used. The galleries enclosing the great roof consist of a nave with raised roof, as has been mentioned, open to the top, while the aisles on each side are covered with lean-to roofs.

At regularly-spaced intervals on the plan, galleries supported by columns are taken across at the first floor level to connect the gallery floors of the two aisles. For the purpose of ready access to the gallery, groups of staircases are placed at each angle of the building, and two on each side of the central

entrance, while twelve others are conveniently placed, while at the north end of the building lifts which convey passengers to the external walking way round the main roof are arranged.

To design a building one-third of a mile long and nearly one-sixth of a mile wide, and with a height limited to 60 ft., the height agreed upon by the architects whose buildings abutted on the Central Court, was the task then given to Mr. Post, who took as his module or unit of measurement a length of 25 ft., or half the space between the main trusses. This disposition allowed him to place 58 of these openings in each long façade, *i.e.*, 29 on each side of the central feature, and 22 openings on each of the shorter façades, *i.e.*, 11 on each side of the central feature, for which he allowed a space of 122 ft. 6 in. in width, the great trusses being specially placed opposite these to suit this feature. The general idea of the elevation consists of a series of square piers with Corinthian-like caps from which spring semi-circular arches, the spandrels being filled in with carving of a not very high order; above is placed a boldly-designed cornice 60 ft. high, crowned with a balustrade, the piers below being emphasized by flag-poles. At the four corners of the building, where the four outer aisles cross one another, are placed pavilions about 60 ft. square, slightly projecting beyond the general face, and consisting of a semi-circular arch on each side, bounded with two pairs of Corinthian columns right and left round which the cornice breaks, and crowned above with flag-posts.

The cornice of the curtain wall stops abruptly against this feature, which serves as a boundary or enclosing line for the whole design. The central feature in each façade, of about double the width, is composed of a three-arched opening, somewhat similar in arrangement to the arch of Constantine at Rome, the lower arches on each side being the same as those of the openings in the curtain walls, thus helping to blend these with the central *motif*. Above the smaller arches are inscriptions, while the central arch, of much greater width, is taken high above, and the whole is crowned with an entablature and a low attic. In front of the piers supporting the arches are colossal Corinthian columns,



THE WOMENS
BUILDING



THE
UNITED STATES
GOVERNMENT
BUILDING.



THE MINING
BUILDING



THE GERMAN
BUILDING



OLD VIENNA
AUSTRIAN VILLAGE.



MAIN ENTRANCE
ELECTRICITY
BUILDING.

around which break the cornice, and which are emphasised above with statuary and flag-poles.

It will thus be seen that the general scheme is simple, and we think that Mr. Post has been wise in adopting such a treatment.

In a building of ordinary dimensions, it is sometimes customary, in order to avoid excessive appearance of length, to introduce features with an upward tendency, to correct this lengthy feeling, as has been done at the Agricultural Building opposite, but it will readily be seen that in a building one-third of a mile long, it becomes impossible to take in at a glance the detail of any such features, which would consequently appear meaningless, and tend to take away from the dignity of the composition as a whole. These fifty-eight openings of a similar design on the main front tend to give the façade an appearance similar to that of the old Roman aqueducts seen stretching across the country around Rome, and which gain most of the dignity they possess in the repetition of their parts. The skyline has been left unbroken in Mr. Post's design, save for the flag-posts occurring over each pier, and the raised angle and central features, which are boldly accentuated.

The effect of the great roof rising in stages across the outer roof and crowned by the walking way and the lantern at top, is very fine, and composes well.

As to the interior, the great roof itself is an object-lesson of the greatest interest, apart from its wide span. The framework of steel strikes one as being considerably lighter than the Paris example, the trusses being formed of triangular bracing between the inner and outer flanges, instead of cross-bracing as at Paris. The steel is not painted, but remains as it left the works; the result being that it has a certain tone of a varying reddish brown, which is better than a painted surface, and which, being unpainted, saved the authorities a considerable sum of money, amounting to some thousands of pounds sterling. As to general appearance, the roof, although larger in every way, looks smaller than the Paris example; this can be ascribed to two or three reasons. In the first place its greater height takes away from the apparent width in a way which is very marked. In the second place, the ends being hipped take away immensely from the apparent length. It may be said that a semi-circular proportion as adopted here is a better one—it certainly is more classic; but, on the other hand, it does not bring out to the greatest advantage the enormous span. The effect of the comparatively low arches of the Paris example, and the gable ends, gave it a breadth and a length which created an impression on the beholder which are wanting in the example under discussion. Mr. Shankland, the Chief Engineer, has been responsible for the working out of the details of this roof, and great credit is due to him for the manner in which it has been carried out, as also to the contractors, the trusses being erected with a rapidity which is without parallel for a work of this importance.

The sculpture decoration has been designed and carried out by Mr. Karl Bülter, of New York, under the architect's direction. Of course, it does not compare with the work on the Administration Building or the Agricultural Building in importance. At the base of each flag-staff to the main entrance is an eagle with outstretched wings. If the sculpture is unimportant it is made up for by the coloured decoration in the spandrels and domes of the central and angle pavilions, on which some of the best artists in the States have been employed; these will be dealt with in a special article on the colour-decoration of the building, which will appear later.

The Electricity Building (see sketches, p. 3, ante), designed by Messrs. Van Brunt & Howe, of Kansas City, is placed on a site which has a frontage of 350 ft. to the great court, and whose major axis has a length of

700 ft. running north and south. The building is bounded on the east by the North Canal, connecting the Grand Basin with the picturesque lagoon, and on the west by the avenue which separates the Mines Building from the Electricity Building, and the centre of which is on the axis of the Administration Building. The plan of the building is divided up into 23 ft. bays, corresponding with the interior supports to the galleries.

The general scheme consists of a nave 115 ft. wide, and of about the same height, crossed at right-angles in the centre by another nave of the same proportions. The trusses are composed of a light iron framework of steel, the upper part being semi-circular in outline, the trusses being composed of inner and outer members, and connected by lattice bracing; at the base the standards are brought to a point and rest on a steel pin. The back members of the standard are taken up above the aisle roof, and have clearstory windows formed in this portion, while the lower portion of the roof itself is filled with glazing. The remaining portion of the area on the ground floor is spaced out to correspond with the 23 ft. bays of the elevation, with wooden posts supporting the gallery floor, through which light is admitted, from skylights in the flat roof which covers these galleries, at every alternate bay. Access to these galleries is obtained by means of four large staircases and by subsidiary ones.

In the centre of each of the four sides is an entrance pavilion, against which the roofs abut, and which are treated somewhat differently. The southern end of the building, abutting on the main court, is provided with a covered ambulatory extending the whole width of the façade, in the centre of which is the principal entrance, consisting of a semi-circular recessed porch 78 ft. in width. It is treated as a triumphal arch 60 ft. wide and 92 ft. high, the arch-mouldings springing from the main cornice. Above, and supported, as it were, by Corinthian pilasters, is a pediment filled with sculpture and supported by figures emblematic of electric lighting and the telegraph, while the whole is capped by an attic crowned with a horizontal cornice, the whole central feature being supported on either side by consoles. In the centre of the semi-circular entrance is placed a statue of Franklin, 15 ft. high, and resting on a pedestal with the historic kite and key, observing the storm clouds. The upper part of the entrance under the arch is treated as a half-dome, divided by ribs carried above the Corinthian pilasters, which are continuous with those running round the building. This covered portion is treated in a light key with colour. From this semi-circle three doorways lead into the central nave, while one on each side leads into the covered ambulatory. The northern entrance, facing on the lagoon, is recessed behind a one-storied loggia, whose roof is supported by Ionic columns of the same type as those which support the galleries on the façades. This loggia is also treated in bright colours of yellows or reds, while above, on the main wall, is a huge semi-circular window expressing the great nave. On either side the surrounding and storied aisles are projected forward beyond the loggia and finished with circular ends struck from a radius of about 50 ft. On the upper story are placed the restaurants. The eastern and western entrances are treated as porticos, slightly projecting, and with circular ends brought back to the face of the curtain walls. As to the elevation, the main scheme consists of a series of fluted Corinthian pilasters 42 ft. high, crowned with entablature and balustrade which break around the pilasters and are carried up with flag-posts. Between these pilasters at the first floor level is a horizontal cornice supported in the centre by an Ionic column. The main entrances are raised and crowned with sculptured pediments on the east and west sides. Against these the roofs of the main naves abut. On either side of these entrances, with

the exception of that abutting on the court, towers, 23 ft. wide, are taken up for a height of 170 ft. to the east and west entrances, and 190 ft. to the north entrance. Besides these, and giving a vertical tendency to the composition, in the centre of each curtain wall on either side of the central *motifs* in each façade is carried up a tower, 150 ft. high, with circular dome, which is gilded,* and at each angle of the building a tower in three stages is also raised above the pavilions which mark these points. These towers are introduced by the architects, so as to accentuate the vertical elements and to give to the general design a movement which, "in contrast with its neighbours, may be suggestive of the mysterious functions of electricity." The ironwork of the main roofs is painted a light blue colour, which gives it a lightness which is very suitable, but the ironwork itself is very light in structure, and differs in this respect from the Mining Building next to it. The scale of the Electricity Building is smaller than the buildings which surround it, and the whole composition is more varied in outline than any of the buildings which abut on the main court, and which we believe it was the purpose of the architects to accentuate.

NOTES.



THE discovery of coal at Dover seems to be attracting considerable attention at the present time on the other side of the Channel; the inhabitants of Calais now desire to know whether that useful mineral passes under or near their town. Consequently, they have this week started a "Société de Recherches de Mines de Charbon dans le Pas-de-Calais"—rather a broad title, seeing that their operations are restricted by the articles of association to the town of Calais, and the country immediately adjacent. However, it appears from the report of M. Gustave Dollfus, a well-known French geologist, attached to the Geological Survey of the Republic, that the chances of finding coal are mainly based on the researches of Godwin-Austen, the English geologist, who predicted, in 1854, that coal would be found where it has now been proved, at Dover, and that the same coal-field most probably extended across the Channel into the Pas de Calais. In giving an excellent *résumé* of what is known of the subject, M. Dollfus remarks that all attempts at prosecuting a search for coal near Calais have hitherto been considerably retarded by certain French geologists, who believed that the small coal-basin in the Boulonnais, worked at Hardingham, was originally continuous with the immense basin coming from the eastward through Namur, all actual knowledge of which is lost on arriving at Flechinelles and Auchy-au-Bois. If this hypothesis were correct, it would practically be useless to bore at Calais, which is situated to the north of the line of strike indicated. But it has since been recognised that the coal of Hardingham differs from that at Flechinelles, and our neighbours are now sanguine that the Carboniferous strata from the last-mentioned place pass under Calais and on to Dover. It is thought that the Coal Measures are not so far from the surface on the French side as on the English. There is one ugly circumstance which it is impossible to forget in considering the chances of success of the *Société*, namely, that a deep boring executed many years ago at Calais was reported by M. Meugy, a distinguished geologist, to have reached the Carboniferous Limestone—a bed normally found beneath the Coal Measures. We hope, for the sake of the promoters of the scheme now under discussion, that the observations of M. Meugy will be found to be incorrect. At all events, there seem to be some grounds for the rather facetious remark in M. Dollfus' report,

* These pavilions project slightly, and contain doorways at the ground level which act as subsidiary entrances.

that "*Un jour la vraie communication souterraine entre la France et l'Angleterre se fera par une galerie houillère.*"

EXTENSIONS to the public baths and washhouses of the Parish of St. James, Westminster, in Marshall-street, Golden-square, have recently been completed, from the designs of Messrs. Spalding & Cross. Great success appears to have attended these baths ever since their erection in 1851, and 121,893*l.* has been received from the six and three-quarter millions of bathers and washers who have used the baths during the forty years of their existence. The building was erected in 1851, on the site of a freehold house, No. 16, Marshall-street, then in the occupation of the Paving Commissioners, and was extended in 1861 by the appropriation and adaptation of the two adjoining houses, Nos. 17 and 18, Marshall-street, under Mr. Charles Lee, architect. The present additions have covered the site occupied by Nos. 14 and 15, Marshall-street. The space has been devoted to a first-class swimming-bath, of moderate dimensions, on the ground floor. An ample basement is secured by building the bath on continuous arches, and this will serve as an ample storage space in connexion with the stone-ward, which is at the back. The aim of the architects appears to have been to relieve the interior fittings of the dreary monotony which is too often present in London baths, and by the use of glazed tiles and marble in the floor covering, and similar tiles which completely cover the wall surfaces, and are relieved by hand-painted tile panels and figures judiciously distributed, a satisfactory and refreshing result has been obtained. The bath, which is entirely lighted from the roof, has gangways on three sides, and the dressing-boxes are arranged in a series of arched recesses at the sides, separated from the bath platform by semi-circular headed openings, the piers of which receive the ends of the semi-circular shaped wrought-iron roof principals. The roof soffits are covered with enamelled iron ceiling-plates. The basement contains the establishment laundry and the boilers which contribute the hot water for the swimming-bath. Messrs. Simpson & Son supplied the ceiling-plates and tile work generally, whilst the iron roof principals were supplied by Messrs. Homan & Rodgers, and the heating arrangements are by Messrs. Berry & Sons, of Westminster. The general contract was carried out by Messrs. Gould & Brand, of Camden Town.

FROM a report published in the *Glasgow Echo* of July 26, it appears that the Municipal Buildings, which have not been many years completed, are developing very unsatisfactory conditions in regard to their drainage. An examination of them has been made by Mr. Peter Fyfe, Sanitary Inspector, by the instructions of a sub-committee of the Municipal Buildings Committee. The results of a smoke test applied to the clean-water drain system has been followed by the outburst of smoke from soil-pipes, and conversely the smoke testing of the horizontal soil drains showed a connexion with the clean-water system of pipes. In fact, it is stated that the results of the tests indicated that the smoke test applied to either system of pipes would, if continued long enough, fill every pipe in the building. The ventilation of the whole of the drainage, we are told, is supposed to be effected through two 6-in. iron pipes led from the drains to the chimney-stalk attached to the steam boiler, and intended of course to act as an extract. Examination at the tops of the soil-pipes, however, showed that only the two nearest to these extracts were drawing downwards; the rest showed an upward current. The most surprising revelation made in the report is that the closets are all trapped with D traps, which, even at the time the building was commenced, had been long under the condemnation of sanitarians.

Other details given concur to indicate that this important building, on which the inhabitants of Glasgow so pride themselves, must be in a very unsatisfactory state as regards sanitation.

THE Berlin technical press laments the pitiable architectural show at the Art Exhibition, and ascribes the dearth of exhibits to the counter-attractions to architects of the Chicago World's Fair. The Berlin hanging committee has distinguished itself again by finding the most out-of-the-way places for the architectural exhibits, and these, even with a few exceptions, are inferior in quality to those of the regular annual art show. There are only thirty numbers in the architectural section of the catalogue, and these are supplied by not more than a dozen contributors. Churches, in accordance with the present fashion for them, predominate. Messrs. Abesser and Kröger, among others, show a large one for Breslau; Messrs. Schilleng and Graebner, of Dresden, a picturesque little one for Bautzen. Herr Seeling shows some excellent competition drawings for the Berlin Provincial Museum, for which he obtained a premium, and further some views of his "New" Theatre in Berlin and the municipal theatre in Plauen. Herr Heim exhibits some of his hotels, and Herr Braek [some town houses which are unfortunate attempts to copy some English mannerisms. This is probably the last time architecture will figure in the Berlin art shows, as the energetic "Vereinigung Berlin Architekten" will henceforward have its own annual exhibition of drawings.

THE Clergy Orphan Corporation seek to obtain a site of not less than five acres, near London, on which to erect a girls' school, or to find a house and grounds to accommodate 150 inmates. Their removal from the buildings in St. John's Wood-road seems to prelude the changes which may be expected to come about as the scheme for a new trunk line to London of the Manchester, Sheffield, and Lincolnshire Railway assumes more definite shape. At a meeting of the Marylebone Cricket Club held at Lord's on December 7, 1891, the members present ultimately resolved to agree to terms whereby the company undertook to purchase the whole of the school site, and give out of it an area of about 8,600 square yards to the club, in exchange for the M.C.C.'s withdrawal of opposition to the Bill, and consent to tunnel beneath the east side of their ground to a width of 124 ft., reckoning from the Wellington-road. This portion, formerly Henderson's nursery-ground, and bought, freehold, for 18,500*l.* from the Clergy Orphan Corporation, in April, 1889, is now used for practice at the nets. Our readers will recollect that the Company's proposal to establish a large terminus on the Harewood and Dorset squares' site—the latter square being the spot where Thomas Lord and the M.C.C. established themselves in 1787—aroused considerable opposition. The inhabitants found a champion in Miss Octavia Hill. A passage from a letter written by that lady to the *Times* of June 7 last year is worthy to be rehearsed at this juncture:—

"This railway proposes to destroy two squares; to invade acres of space covered with cheap, pleasant houses with gardens; if constructed it would in a great measure cut off the whole poor district of Lisson Grove from its natural playground—Regent's Park—which at present is approached by pleasant wide streets with little traffic, safe for small groups of children to traverse alone, wide breathing-spaces, now bright with laburnum and lilac hanging over the low garden walls."

The problem for Londoners, Miss Hill says, is no longer how to provide many houses for the poor, but how to procure, for poor and rich, houses with such conditions as shall make life healthy and happy.

THE *Transactions* of the American Society of Civil Engineers for April contain an account of a discussion of a paper read at one of their meetings upon "Tuberculation in Water-Pipes," in which it was held that while there is a vast deal of difference in the action of different waters in producing tuberculation, its action in a wrought-iron pipe is more rapid than in cast-iron pipes. A water-main properly coated with tar is free from tuberculation, provided the tar-coating forms an absolutely perfect covering over the surface of the pipe, as every minute hole in the coating forms the nucleus about which a tubercle or pimple is sure to form. The great value of interior coating in preventing tubercles is evident, when its influence in checking the flow is considered. It is not unusual, in addition to the condition that water-pipes shall be cast vertically with the socket end downwards, to specify in English practice that every pipe is to be cleansed and fettled on leaving the sand, and while warm to be immersed in Dr. Angus Smith's preparation for the purpose of preventing rust.

THE *Journal* of the Franklin Institute for July provides an interesting paper upon the "Causes of Fire in Dwellings," in which the author attributes them chiefly to heating and lighting apparatus. Statistics on the causes of fires have been very meagre. Strict cleanliness in heating arrangements is urged, as fires are often produced by accumulation of dust and fine organic matter, and before "firing-up" in the autumn it is recommended that the entire apparatus be thoroughly examined. Ashes retain heat for a long time, and when seemingly cooled should not be placed in wooden barrels or near frame buildings. Gas fixtures should not be so fixed as to be capable of swinging against combustible substances, such as curtains and woodwork, but should be provided with stops to obviate such danger. Another point often overlooked is that if a window be opened near a gas burner a draught may blow a lace curtain into the flame, and a fire results. The author argues that woodwork near stoves should be protected with bright tin, which acts as a reflector to the heat rays, while a black or rough surface absorbs them. Also that while brick platforms are not so safe as tin, because stoves are not apt to remain as stable upon brick as upon metal, that brick arches are the proper means to adopt to protect flooring, and that if brick arches cannot be obtained, then a layer of thick asbestos paper or concrete should be first laid on the woodwork, upon this a layer of sand and concrete, and then bricks laid in good cement, upon which another layer of bricks should be laid, but in such a manner as to leave an air space between it and the preceding course. The safest system of heating, however, he considers to be by hot water, with pipes fixed free from any woodwork. The reason why steam-pipes ignite wood he asserts to be twofold—(1), by allowing the water to run low the steam becomes superheated, causing a true combustion; and (2) pipes containing steam at the usual temperature may cause the secondary phenomenon of spontaneous combustion. In the latter case, the steam pipes slowly dry the wood, the contained moisture being vaporised, and at last the wood assumes a state resembling charcoal, whereupon the glowing or combustion, well known in the case of charcoal, takes place spontaneously. Other trite facts collected in this useful paper render it of practical utility for perusal.

AN architect, a member of the Institute, writes to us:—

"DEAR SIR,—I beg to enclose two cards which have just arrived, addressed to me, which you are at liberty to make any comment upon, omitting my name in the matter.

The sooner this sort of thing is put a stop to, the better will it be for the profession."

The cards enclosed are a trade announcement from an engraver and designer of

"Memorial Tablets, Heraldic, artistic and other brass plates," accompanied by a separate card with the words "A commission of 33 per cent. is allowed on all orders executed through your kind recommendation." We hope all architects who receive this card will note the name of the sender as a person to be boycotted for the future.

LETTER FROM PARIS.

It is curious to observe that the public which shows an entire indifference to the architectural exhibits at the Palais de l'Industrie during the annual Salons, has nevertheless crowded to the same building to see the design for the Opéra Comique. The decision having been made, the centre of interest for the artistic world is now turned towards the Ecole des Beaux-Arts, where the competition for the Prix de Rome was adjudged last week.

In painting, the subject given was Samson, blind, turning the mill amid the jeers of the Philistines. The subject has the advantage of giving an opportunity for the study of the nude, and also for an effective general composition. The competitors have not varied much in their treatment of it. M. Maurice Mitrequey, who has obtained the Grand Prix, has produced a work of great talent, showing solid and luminous painting and careful drawing, qualities which he owes, no doubt, in great measure to the teaching and example of his master, Jules Lefebvre. The principal "second grand prix" has been awarded to M. Trigoutel, a pupil of MM. Gerôme and Henri Lévy (who has shown perhaps more vigour but less learning in his composition, than are seen in the prize work), and the "second grand prix" to M. Georges Charbonneau, pupil of M. Bonnat. The picture by M. Rouault is noteworthy for a real originality which gives much promise for the future.

In sculpture the subject given was "The Golden Age in the reign of Saturn," as described by Hesiod. The subject has no more novelty than that for painting, but, like the former, gives the competitors the opportunity of showing their knowledge of anatomy. The jury awarded the grand prix to M. Octobre, pupil of MM. Cavelier and Tony Noël, who submitted a bas-relief which is truly masterly in style. The principal "second grand prix" was awarded to M. Desruelles, pupil of MM. Falguière and Lanson, whose figures are modelled with great delicacy and with a pretty natural sentiment. The inferior "second grand prize" has been awarded to M. Lemarquier, pupil of MM. Thomas, C. M. Gautier and Moreau-Vauthier, for a scene with a curious bucolic simplicity. M. Belloc having already obtained the "second grand prix" in a previous year, is precluded this year from competing except for the first place, which he has failed to obtain in this instance, though he is a young sculptor with an undoubted future, and his Virgilian idyll pleased us much by its simplicity and poetic charm. The whole exhibition of works has proved of higher interest than usual, and speaks well for the general level of artistic attainment among the younger generation.

While M. Nenot is actively engaged in the task of carrying on the new Sorbonne buildings in such a manner as not to interfere with the work of the various "Facultés," the Department of Fine Arts is occupying itself about the decoration of these buildings. Eleven painters have received important commissions for decorative works. M. Besnard is to execute a mural painting of large dimensions for the amphitheatre of the Chemistry section; M. Gervex is commissioned to make a mural painting and two panels for the amphitheatre of the Physics section; M. Montenard will decorate the amphitheatre of Mineralogy. In the large hall of the Conseil Académique, M. Benjamin-Constant is to paint six medallions representing the Faculties of Law, Medicine, Science, Literature, the Schools of Charters and of Chemistry. The amphitheatre of Anatomy will be decorated by M. Aimé Morot; that of the Faculté des Lettres is entrusted to M. Gabriel Ferrier; that of Geography to M. Toudouze. In the Salle du Doctorat, M. Schommer is to execute a minute picture and a ceiling; M. Rochegrosse will decorate the staircase of the Library, M. Carrière the amphitheatre of Liberal Education, and M. Rixens the Salle St. Jacques, where he is to paint a picture commemorative of the jubilee of M. Pasteur. It would seem, from this list, that the Ministry have been actuated by a desire to hold the balance equal between the members of

the two rival Salons. It may be observed also that all the artists, with the exception of M. Rixens, are left absolutely free in regard to the choice and treatment of their subjects, except that they are required to have a previous understanding with the Rector and with the architect of the building.

Sculpture has had its share in the recent liberalities of the Ministry, which has entrusted a certain number of works to well-known sculptors for the decoration of the new museum of Natural History, a building which, commenced under M. André, has since his death been carried out under the direction of M. Dutert. Five sculptors, MM. Allar, Barrias, Coutan, Frémiet, and Marqueste, have been commissioned to execute models and bas-reliefs. That of M. Allar, the subject of which is not yet known, will form part of the decoration of the facade. MM. Barrias and Coutan will represent "Les Races Humaines." M. Frémiet is to execute a combat of animals; M. Marqueste a combat of men and animals. In regard to the sculptural decoration of the new Sorbonne, M. Nenot has made certain proposals. As the building is being carried out at the joint expense of the State and the Municipality, the works of this nature will be executed at the cost of the Municipality and by sculptors selected by them.

The interior decoration of the Pantheon progresses very slowly. M. Falguière has completed the model for the monument of the French Revolution, which is to be raised at the extremity of the nave, where the choir formerly was. The design has been completely remodelled since its first conception. As now designed it represents an altar "de la Patrie," decorated with flowers, on which are three large statues symbolising Liberty, Equality, and Fraternity, holding each other by the hand, and overshadowed by the folds of a large flag—the national standard. Two subordinate groups are placed one at each side of the altar; on the right, "La Loi" seated, holding a tablet with the code, and "La Renommée" about to take flight to announce to the nations their deliverance from tyranny. On the left is a warrior, sword in hand, ready to defend his country, while near him a female figure on the steps of the altar stretches up her hands towards the figure of Liberty. This model will shortly be examined by the Fine Art Committee.

The Municipal Council, the session of which has just closed, voted, before their separation, for the purchase of a certain number of pictures and statues which had figured in the two Salons of this year. It may be observed also, as a happy innovation, that the Council has not on this occasion confined its purchases to painting and sculpture, but has also purchased a certain number of works of industrial art, which will form part of a collection of ancient and modern decorative art which the municipality is anxious to form in the future Musée Galliera, an excellent idea which cannot be too much encouraged. In spite of the incendiarism of the Commune, the Municipality of Paris still possesses some admirable tapestries and some furniture of great interest. In adding to these some of the objects of faience, stoneware, pewter, &c., annually exhibited by Delaherche, Desbois, and others, they will have in some years a collection of considerable value, while giving a new impulse to art industry. It will be the part of M. Stupuy, the new curator of the artistic collections of the municipality, who is a man of taste and spirit, to aid in the furtherance of this new project.

Some new gifts have been made to the Louvre. The department of Greek and Roman antiquities has received a series of bronzes from the excavations in Algeria, in the camp of Chercell. The department of Greek ceramic works has also received a valuable vase, a "Rhyton" with two heads, in terra-cotta, of the sixth century B.C.; and M. Carpentier has given to the department of painting sixteen works by the landscape-painter Chintreuil.

At the Ecole des Beaux-Arts, the Troyon competition is shortly to be adjudged; the subject is "A Landscape seen under Sunlight Effect after a Storm."

M. Veyrassat, the landscape-painter, who died three weeks ago at Paris, leaves behind him the remembrance of a truly conscientious artist, and a man generally beloved. Since 1848 he exhibited assiduously at all the Salons, either as engraver or painter, and received medals in 1866, 1869, 1872, and 1889. He took pleasure in reproducing, with realistic fidelity, the strong teams with their harness decorated with red and blue, which are to be seen yoked to the waggons of the country people, the horses hauling the canal-boats, &c. In this special class of painting he had acquired a personal

reputation, and many provincial museums possess pictures in which he has illustrated the picturesque aspect of the peasant life of the district. He died at the age of sixty-six.

We have to announce also the death of Mlle. Nelly Marandon de Montyel, a miniature painter of talent, who for more than thirty years directed, with untiring zeal, the "Ecole Nationale de Dessin pour les Jeunes Filles," at Paris. Her father was a painter, of Bordeaux, who had his day of reputation in his art.

THE BRITISH ARCHEOLOGICAL ASSOCIATION AT WINCHESTER.

THE Jubilee Congress of this Association was commenced on Monday last, July 31, the Earl of Northbrook, G.C.S.I., being President of the Association for the year. There is peculiar fitness in the place of meeting, for, while Winchester indicates in all directions that it is essentially a city of the present, the mass of old buildings shows eloquently enough that it is a city of old memories as well. While its name attests its existence in Roman times, the actual plan of the city reminds us forcibly of this early period. The old walls of enclosure no longer exist, and they have been removed so completely that a search is necessary before fragments even can be discovered. Yet the contour of their known direction indicates that the form of the city was a parallelogram, the angles possibly having been rounded, a usual Roman plan. The High-street divides the area into equal portions from east to west, nearly so, but not quite; and the other streets are either at right-angles to or parallel with it, thus preserving in its plan an arrangement that dates most probably from Roman times. Earlier still, however, beyond all doubt was the origin of Winchester; for ancient British coins, and prehistoric relics, even, have been discovered within its area. But apart from mere conjecture and inference, important as these are, Winchester has recently (as was eloquently set forth in the opening address of the noble President) celebrated the eight hundredth anniversary of the erection of its present cathedral, the seven hundredth anniversary of the recognition of its municipality, and the five hundredth of the foundation of its College. The Council of the British Archeological Association, therefore, did well in accepting the invitation of the Mayor and Corporation to hold their fiftieth annual meeting within its walls, and the more so since the second of such gatherings, almost the beginning of the Society, in fact, was held here forty-nine years ago.

Brilliant sunlight enlivened the proceedings when the Mayor and the various members of the City Corporation rendered a hearty welcome to the visitors, the Mayor making a happy address in well-chosen words. Mr. Allan Wyon, F.S.A., Treasurer of the Association, responded, and, in doing so, he took occasion to review the work which had been accomplished by the Association during the period of its existence. Many local associations had been formed; in fact, so many now exist that there is hardly a county without one. Anthropology was a science, arising out of Archaeology, hardly known fifty years ago, which had already produced important results: churches had been restored, more or less well; ancient buildings had been cared for; and public taste had been formed by the various societies to such a degree that the Government in recent years had been able to carry a measure for the permanent preservation of some few ancient works, a thing which would have been impossible at the period prior to the existence of those societies.

The party then adjourned to the Cathedral, where the Dean of Winchester proceeded to describe the ancient fabric and to point out the various points of interest. The heraldic bearings on the roof of the choir engaged much of his attention, and his remarks were of value as showing the aid that heraldry can render in proving the dates of old works. The year 1501 can be shown in this manner to be that of the construction of this portion of the work. The bosses of the first bay are charged with devices relating to the See of Winchester; those of the second bay contain devices relating to the kingdom; while those of the third bay, at the east end, relate to the Passion of our Lord—the emblems forming probably the most complete series in England. The chests containing various bones of the Anglo-Saxon kings and of other persons, confusedly, were pointed out as curious examples of Renaissance work. Indeed, the upper portion of the choir-stalls is a remarkable instance of the new style, which deserves more

attention than has been bestowed upon it. In the crypt, the Dean described the important works of clearance that he has had effected. Not only have various masses of masonry been cleared away, which formerly supported monuments in the church above, not now in existence, but he has had many feet of earth removed. The crypt is now to be seen under circumstances of great advantage in consequence. It is restored to the original level. But it is apparent that it was never put to any use. No interments, no floor paving was found. In fact, although an incredible number of loads of earth were removed, hardly an ancient relic was met with. But it was apparent that the recent level had been in existence from a very early period. This was proved by its having determined the level of Bishop Lucy's work in the early part of the thirteenth century. There is no real foundation for the Cathedral, and one of the columns was found to be built on a large flat slab of stone, resting upon the wet subsoil. Peat exists at a short distance below the present level. Mr. Park Harrison, M.A., pointed out, on the invitation of the Dean, three archaic-looking capitals which he believes to be of Saxon date; and Mr. Loftus Brock, F.S.A., showed two masses of masonry into which Bishop Lucy's work is built, different from the well-defined Norman portions, which may be parts of one of the previous Saxon churches. On returning to the north transept, the Dean referred to the destruction of much of the valuable wall decorations of the chapel of the Holy Sepulchre in recent years by the Cathedral authorities, to gratify the tastes of an irate organist who required and who obtained an easy means of access to his organ—the latter being a huge affair, the posterior elevation of which is no small disfigurement to the north transept. The Dean's discourse was a model one. In front of the objects themselves he spoke of wide and close-jointed masonry, periods of building, heraldry, sculpture, the various important monuments, and shrines; and in the feretory his audience were able to see, by degrees only, owing to the large numbers present, a remarkable collection of fragments of sculpture and carving, found during various recent works, and here preserved. Here is the built-up statue once on the west gable, now superseded by a new one. It had been coarsely carved, and its form made up by a coating of plaster. In the chantry of Bishop Gardiner, the curious reredos, which exhibits much Italian feeling rather than Gothic, was pointed out.*

In the afternoon a visit was paid to Winchester College, where the Bursar of the College, Mr. F. Kirby, F.S.A., one of the Vice-Presidents, indicated many of the various points of interest. He prefaced his remarks by describing the numbers of the various foundations, and how each class was located, how many members were placed in a single apartment; the domestic offices, such as the brewery, the shaving-room, the slaughter-house, &c., requiring prominence in the arrangements. The general ground-plan of the buildings, as erected by William of Wykeham, remains, and the portions added at a later period can readily be traced. The work is designed in a style remarkable for its fitness, ornament being applied where of service, as in the chapel roof and elsewhere. But the buildings are for the most part plain and effective. The cloisters have arched rafters of oak in capital preservation. Mr. Kirby conducted his audience from one quadrangle to another, then into the dining-hall, where the position of the open fireplace was noted; into the chapel, and through the cloisters. The party then proceeded to Wolvesey Palace on the opposite side of the road, where Bishop Morton's work, by some supposed to have been designed by Sir Christopher Wren, was examined, and its state of disuse deplored. The ruins of the fine Norman castle adjoining came in for inspection and description. A visit was then paid to the Hospital of St. Cross, which was described by the Master and others. Here again, a good deal of screenwork was observed, designed entirely in the style of the Renaissance, and it appears evident that Winchester must have helped forward the new style to a degree not hitherto recognised.

In the evening, a large party assembled at the Guildhall, on the invitation of the Mayor and Mayoress, and here the noble President delivered the inaugural address. The civic plate, maces,

&c., were on view, together with a large collection, on loan, of choice books, engravings of old buildings, ancient objects, and especially the important series of Winchester measures. The party separated at a late hour.

On Tuesday, August 1, the proceedings consisted of a journey of exploration of the country to the north of Winchester, and a visit to Stratton Park, on the invitation of the Earl of Northbrook. Proceeding along one of the Roman roads out of the city, the open downs were soon reached, and after a brief halt to inspect some tumuli of very early date, which were described by Mr. T. W. Shore, an extended visit was made to the curious little church at Stoke Charity. It is filled with objects of interest. It consists of a small nave, north aisle, chancel, and north chancel chapel, with a timbered spirelet at the west end of the nave. The arches are well-developed Norman work of good type, and there is an interesting doorway on the north side of the north aisle, in an unusual position for an entrance, close to the chancel arch. On the left of the chancel arch is the peculiarity of a hagioscope with a double slope, one looking into the chantry chapel and the other into the chancel. There are altar tombs, brasses, a little stained glass, and several monumental slabs. But the most unusual object is a sculptured group which deserves to be placed in a better position than the corner in which it is at present deposited. Micheldever Church, like the one last named, was described by Mr. Shore, who briefly related the descent of the Manor and the holding of the property by knight service rendered to the Crown by the monks of Hyde Abbey. The church having been destroyed by fire many years ago, has been rebuilt in brick, in octagonal form, but the ancient fifteenth-century tower remains at the west end. Its bellry windows are filled in with slabs of stone pierced with ornamental apertures, as in the churches of Somerset. Within the chancel are some beautiful monuments by Flaxman. The party then proceeded to Stratton Park, where they were welcomed by the President to luncheon. After a prolonged stay, during which the pictures and other works of art contained in the mansion were examined, the return journey was begun. The mansion is in Classic style, with a portico of four sturdy columns of stone with a pediment, the walls of the fabric being of painted cement. It stands in a park of very great beauty. The church is a new building, in the style of the fifteenth century, built of flint and stone. The site of the former church is in the park, and is marked by a modern cross. A visit was made to King's Worthy Church, a restored building of no great interest, although the font, of fourteenth-century date, is good. The church was described by Mr. Shore and by Mr. N. C. H. Nisbett. The adjoining church of Headbourne Worthy was next inspected, where the Saxon features of the fabric were pointed out by Mr. Loftus Brock. The worked material is Quarr Abbey stone, neatly cut and bedded, the walls being of small rubble and flint. There are several pilaster strips and a little long-and-short work. But the principal feature is the western doorway, over which are large sculptured figures of the Saviour, with St. Mary and St. John, in mutilated condition, but of the same early date. The chancel arch, which was straight-sided, has unfortunately disappeared during the restoration of the church. No attempt, fortunately, has been made to restore a curious thirteenth-century piscina in the nave.

In the evening a meeting was held in the Council Chamber of the Guildhall, at which the Mayor presided. An important paper was read by the Mayor on the well-known font of the Cathedral. He had traced its material to Belgium, and rendered a list of several other fonts in France and the Low Countries so similar in design and material as to justify the belief that the font had been made in Belgium, probably at Tournay. Having regard to the legend of St. Nicholas, events in whose life are represented on the sculptures, the lecturer concluded that it had been carved between the years 1170 and 1200. Another paper was then read by Mr. T. F. Kirby, F.S.A., descriptive of the curious little chantry chapel founded by Fromont within the cloisters of Winchester College. It dates from the year of the founder's death, 1420, when the work was nearly, but not quite, completed. The original deed of trust, with the College seal, was exhibited. The date of erection being so well made out, the building is of interest in regard to the style of its architecture.

[We will next week continue our report of the proceedings of the Congress.]

THE KENT ARCHEOLOGICAL SOCIETY.

THE annual meeting of the Kent Archaeological Society was held on Tuesday, the 25th, and Wednesday, the 26th of July, at Edenbridge. The place of assembly was chosen somewhat away from the usual districts in which the meetings have been held previously, in order that a fresh range of country might be traversed, and a different class of antiquities visited. Kent is a county so large in extent, and so rich in antiquities, that this district has remained unexplored without any diminution of interest in the programmes of previous years. The scenery of the locality, now opened up from London by the new railway to Tunbridge Wells, is of great beauty, and it appeared to be unknown to the bulk of the visitors. At eleven o'clock on the 25th the proceedings were commenced by the holding of the annual meeting, at which the President, the Earl Stanhope, F.S.A., took the chair. The report presented indicated a very flourishing condition of things, there being over 800 members, and more than 700*l.* in the bankers' hands. Nearly thirty new members were elected, as accessions to the numbers noted above. By the close of the proceedings, a large contingent of members and their friends had arrived, and the party, to the number of over two hundred, proceeded to Edenbridge Church, where, after they had been welcomed by the vicar, the Rev. C. F. Gore, M.A., an interesting description of the building was given by Mr. J. Oldrid Scott, F.S.A. The church is a double one, the northern nave being the oldest portion, although the fabric must have been rebuilt to its existing size early in the sixteenth century, the nave arcade being fifty years later still, and many of the windows being fifteenth-century insertions. At the west end is a tower with a timber-shingled spire. Mr. Scott pointed out a single small Norman window on the north side of the nave.

In the afternoon the party proceeded in a long cavalcade of carriages along the pretty lanes of the district to Hever. At the church the Rev. R. Latham Brown, M.A., gave a short description of the fabric, which consists of a nave and a single aisle, each repeated to the chancel, both aisles being on the north sides, that to the chancel being a chapel, containing the altar tomb and the well-known brass of Sir Thos. Boleyn, Earl of Wiltshire, the father of Queen Anne Boleyn. This, and the beautiful brass on the floor of the chancel to the memory of Margaret Cheyne, *ob.* 1419, were much admired. The nave arcade is in admirable condition. The church has a lofty timber spire, covered with shingle.

A visit was then made to the principal object of the day's pilgrimage, the fine old Castle of Hever. The party entirely filled the quadrangle within the entrance gateway, and here Mr. Loftus Brock, F.S.A., described the ground-plan of the castle, and related its history. No part is earlier than the building erected by W. de Hever after obtaining licence to crenellate, *temp.* Edward III. Considerable portions of this early building still remain incorporated in later work; and they were pointed out. The principal parts, however, and the fine gateway, date from the time when the Boleyn family settled here, on the purchase of the estate by Sir Geoffrey Boleyn, Lord Mayor of London, *temp.* Henry VI.; but the fabric was again remodelled early in the seventeenth century, the long gallery and much of the quadrangle being in portions at this period the hall lost its open roof; and a flat ceiling was substituted, the ornamental ceilings of the living-rooms, including that of the room in which Anne Boleyn is said to have been born and Queen Anne of Cleves to have died, being of the later time. It is, therefore, a mistake to believe that the fabric is of one date. Its general resemblance in plan to Igham Mote was pointed out, and references made to the truth of the traditional visits of King Henry VIII. prior to his marriage with Anne Boleyn.

Chiddingstone was next visited, where the party saw for the first time during the proceedings some of the monumental slabs of cast iron, for which the district was celebrated. The remarkable timber houses of the village, opposite the church, were inspected; and some of the party paid a visit to the Chidding Stone, from which the village takes its name. An evening meeting was held after the return to Edenbridge, when papers were read on Edenbridge on Gavelkind; and on the iron trade of the Weald of Kent, Earl Stanhope presiding.

On Wednesday, the 26th, an early morning of brilliant sunshine was followed by heavy thunder-

* It may be worth mentioning here that Winchester Cathedral was illustrated and described in some detail in the *Builder* for October 1, 1892.

clouds and drenching rain. The proceedings were greatly hindered in consequence, and it was fully mid-day when there was any prospect of a change of weather.

The rain was not over when a long line of carriages was formed, numbering over twenty, and a large party started to visit Cowden Church and Lindfield Mark. The quaint village of Cowden, with its picturesque group of tiled houses and trees grouped around the lofty spire of the church, forms a ready-made picture for the artist. The church consists of a nave with a north aisle, a chancel, and a south porch. The spire, which is wholly of heavy timber framing, covered externally with shingle and tile, stands on huge trusses the whole width of the west-end of the nave. From these, the sides of the tower are carried up in timber before the slender spire begins. Mr. Oldrid Scott described the fabric, expressing his belief that the whole of the timber framing was of fourteenth-century work, the open roofs of the church being a little later. The mouldings pretty clearly confirm his opinion. There is a charming wrought-iron stand for an hour-glass still remaining attached to the seventeenth-century pulpit. Mr. G. Leveson-Gower, F.S.A., gave a description of several curious entries in the church books relative to lights burning before statues, etc.

It had been intended to pay visits to the fine old houses of Crippenden, the home of the Tichborne family, where the panelled hall was to have been seen; and also to the old house, Scarlets, but the delay owing to the weather rendered this impossible, and progress was therefore made direct to Cowden.

Passing several of the enclosed sheets of water, once used in the iron manufacture, when the district was filled with smelting works, the party at last arrived at the great earthwork at Lingfield Mark. Here, in a tent, the whole party partook of Mr. V. Beresford Melville's hospitality. Afterwards, Mr. Geo. Payne, Hon. Secretary, to whom much praise was given for his management of the arrangements, delivered an interesting lecture on the camp, pointing out its three lines of defence. Although occupied by the Romans, it is clearly a fortified *oppidum* of the ancient Britons, and its relation to other camps within sight was explained.

The sun shone out brilliantly, and a long stretch of country, large parts of Kent, Surrey, and Sussex, was laid out like a map at the spectators' feet. Towards London dark storm clouds still hovered. On the return journey some of the party visited the old house known as Bazing, and later further hospitality was received by the party at Oakdene by Mr. H. A. Darbishire, J.P. Here an interesting meeting was brought to a close.

THE INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

We resume our special report of the annual meeting of this Association, held at West Bromwich on July 13, 14, and 15 (see the *Builder* for July 22, p. 65, for the suggestive inaugural address of the President—Mr. J. T. Eayrs—and other matter).

The Parish and District Councils Bill.

Mr. Robert Godfrey, Assoc.-M. Inst. C.E., Surveyor to the King's Norton Rural Sanitary Authority, and District Surveyor to the Northfield Highway Board, read a paper on "The Parish and District Councils Bill (Local Government Bill, 1893)," in the course of which he said:—

During the nineteen years of the existence of this Association, it has never happened that a Bill materially affecting a considerable number of its members has been before Parliament at the time of the annual meeting; and the fact of the Parish and District Councils Bill being still under consideration at the present time affords a good opportunity for the discussion of its provisions, in so far as they bear upon the position and duties of many of the members of this Association.

The Municipal Corporations Act was the first great step in affording communities the means of adopting measures to protect the public health, but its provisions only affected a comparatively small area of the country. The Act of 1848 was the next step by which communities outside the limits of the Municipal Corporations Act were enabled to adopt a form of local government, and to adopt those measures which related to the conservation of public health.

The Public Health Act of 1873, which was a very fair attempt at codification, next covered the remaining portion of the country with "Authorities," upon whom devolved some few of the duties which pertained to urban authorities.

Next came the long-looked-for Local Govern-

ment Act of 1888, which established the County Councils, and at length, in 1893, twenty years after the Act of 1873, we have an attempt to reform the Rural Sanitary Authorities established by that Act.

Mr. Fowler, in introducing this Bill, said: "The present Government is not open to the censure so freely cast upon it of introducing a sort of harum-scarum Bill, for which there is no necessity and no demand, and which is to serve some political purpose;" but the writer is of opinion that the adjective "harum-scarum" is very appropriate, and there is abundant internal evidence of the harum-scarum nature of the Bill. With the politics of the matter we have nothing to do. The aim of this Association should be to endeavour, on the one hand, to take such measures as will improve the Bill, both in the interests of the members who are prejudicially affected by it, and on the other to get introduced into it clauses which, at present, can only be obtained by consent of the Local Government Board.

Briefly, three new authorities are established:—

1. *The Parish Meeting*, whose functions are to—*a.* Elect the Parish Council if no poll is demanded. Sec. 3 (5). *b.* Adopt the "adoptive Acts" if in its wisdom it sees fit to do so. Sec. 7. *c.* Assent or dissent to the sale or exchange of parish property. Sec. 10 (11). *d.* Exercise the power of veto on the expenditure of the Parish Council. *e.* Exercise the veto on the action of the Parish Council in the matter of closing foot-paths and roads.

2. *The Parish Council*.—In parishes with over 300 inhabitants there shall be a Parish Council. This will affect some 7,000 parishes in the country, with from 300 persons upwards, and here one of the first evidences of harum-scarum preparation is manifest. The nominations for members of the Parish Council are to be made at the Parish Meeting, Sec. 3 (5); and in the 1st Schedule, par. 6, the following extraordinary provision is made:—

"If the number of candidates does not exceed the number of Councillors to be elected, the chairman shall put the names of the candidates to the meeting, and if those candidates are accepted by those present at the meeting, they shall be deemed to be elected *unless a poll is demanded*." What is the object of a poll under such circumstances? It passeth the wit of man to decide.

The Parish Council having been elected, its functions are shortly as follows:—*a.* Appoint overseers and assistant overseers. Sec. 5. *b.* Hold parish property. Sec. 5 (2 c). *c.* Maintain closed churchyards. Sec. 6 (b). *d.* Undertake the duties of overseers "with respect to appeals by them in respect of the valuation lists, *poor rate*, or county rate, or the basis of the county rate." Sec. 6 (2, 1). Overseers act in appeals to settle the county rate, but the valuation lists and poor rate cause the overseers to be appealed against. *e.* Provide parish books, vestry room, or parochial office, parish chest, fire engine, fire escape, or matters relating thereto. Sec. 6. *f.* Hold parish property, village greens, allotments for recreation grounds or gardens. Sec. 6. *g.* Power to dispose of parish property (that is now vested in the guardians). Sec. 6. *h.* Deal with the allotments question, both by way of making representation and by managing them. *i.* Execute adoptive Acts when the Parish Meeting adopts them. Sec. 7 (6). The above are mandatory.

In Sec. 8 (1) is a list of additional powers, which are similar to powers now exercised by urban authorities, as to acquiring buildings, lands, and the execution of works; but one of these additional powers is extremely novel, viz., "to utilise any supply of water within their parish." It is a well-known axiom that there is no right in *underground* water; if this is allowed to stand there will be no right in *overground* water, and a Parish Council may abstract water from any mill-stream, to the injury of the mill-owner, and pay no compensation. The clause does not even say for what purposes the water is to be utilised, whether for a public water supply or for providing a boat pool for the edification of the juvenile parishioners.

Another clause in this section is equally incomprehensible. The Parish Council is to have power to acquire any right of way, easement, or other right, whether within or without their parish, "the acquisition of which is beneficial to any inhabitant of the parish." Where will this land the Parish Councils? As it stands it means that any Parish Council in the kingdom may acquire rights of way over the Lake Hills, or

Clifton Downs, or any other holiday resorts which are undoubtedly beneficial to many inhabitants who do not reside in the parishes where such rights of way exist.

These are simply a couple of instances of the harum-scarum nature of the Bill, and time alone prevents others being pointed out.

With these two bodies the members of this Association will have little or nothing to do, fortunately, as the spending power of the Parish Meeting is *nil*; and that of the Parish Council is to be limited to one penny in the pound, unless by sanction of the District Council a loan is obtained, the repayment of which may exceed the "penny."

The third authority to be established is *The District Council*, and it is with the constitution of this, and the powers with which it is to be invested, that we are most concerned.

And here at the outset the author cannot but say that a great opportunity has been lost of enunciating a bold and comprehensive scheme of local self government. A complete severance should be effected between Poor Law work and, if the word may be so applied, "Municipal" work. While the area of the Poor Law Union will, in the majority of cases, form a very convenient unit for the District Councils, the composition of those Councils is open to serious objection. With the union area as the unit, many of the new District Councils will be large and unwieldy, and a smaller Council selected from the whole area, without any reference to Poor Law work, would have produced a more representative type of Councillors and a more business-like Council.

The "Municipal" work of one Rural Sanitary Authority, within the author's knowledge, is admirably managed by a Committee of eighteen members, under the powers of the Public Health Act, 1875. By this Bill the District Council will consist of about fifty-eight members.

The rural District Council will be the Rural Sanitary Authority under another name, but, by the abolition of highway authorities of every description in rural districts, with enormously increased work, the urban District Council will be simply the Local Board, Improvement Commissioners, &c., with a new title. The Bill does not affect these to any material extent, beyond abolishing the present mode of election and substituting the routine of the Ballot Act. These may be passed by, well knowing that the interests of their Surveyors are safe.

But with rural District Councils the changes proposed are far-reaching and important. By Sec. 189 of the Public Health Act, 1875, every urban authority "shall" appoint a Surveyor, but Sec. 190 omits that officer in the list of those to be appointed by Rural Sanitary Authorities, and here the influence of this Association should be brought to bear, to induce the Government to abolish the distinction between urban and rural districts, in that particular point at least. The Surveyor will be as much needed under the rural District Councils as under the urban district Councils, and although from motives of so-called economy some Rural Authorities do not appoint a Surveyor, under this Bill it ought to be compulsory.

By the Act of 1847, the Surveyor was not removable at the pleasure of the Authority appointing him, without the consent of the Central Authority, and, while not advocating "protection," there ought to be some means of preventing Surveyors being made the butt of interested persons who get on the Board.

The Public Health Act (London) has prescribed a qualification for inspector of nuisances, or, as he is to be called in the future, "Sanitary Inspector," while the Medical Officer of Health must have the usual diplomas; and in the interest of the members of the profession generally, the appointment of properly-qualified Surveyors should be included in the Bill now before the House.

The gradual assumption of urban power by rural authorities, particularly in the matter of buildings, brings the Surveyor into conflict with the jerry builder, and it often happens that if the jerry builder does not get on the Board himself, he has a friend who is a member, so that the Surveyor is severely handicapped, and in endeavouring to do his duty is branded as a tyrant, and unless well supported by the Board is sure to have to give way or lose his situation. Surveyors ought not, in the interests of the public health, to be placed in this position, and some representation on the subject should be made to the Secretary of the Local Government Board.

The amount of work to be thrown upon existing Surveyors to Rural Sanitary Authorities, of whom there are nearly forty in this Association, will be

enormous, and at the first glance it seems that their position will be improved, more especially in those districts where the roads are at present under the Parish Surveyor. Where Highway Boards, &c., exist, the Surveyors of those Boards will become officers of the rural District Council (Sec. 64), and until such officers resign or are promoted the work will go on almost as at present.

The care and maintenance of the enormous length of district roads which will devolve on the District Councils will necessitate a largely-increased staff, both clerical and working, and the Rural Sanitary Authority members of this Association must be prepared to consider the best means of carrying on the work of road maintenance, which will involve a greater amount of friction than all the other duties of the office.

Time will only permit of some few of the anomalies of the Bill being pointed out, which are more apparent in the matter of highways than almost any other part.

The Parish Council is invested with the duty of repairing and maintaining footpaths. Sec. 12 (2). By the transfer of the power of the Highway Acts to the District Councils, this same duty is imposed on them. So that there will be two Councils invested with the same duty, and the usual result of dual authority may be expected.

Sec. 12 (2) is very vague. By the Local Government Act, 1888, a District Council may undertake the repair and maintenance of the main roads, but until the Westminster case this did not include footpaths. Now the Parish Councils "may undertake," although the Act of 1888 empowers the District Councils to do it, and although the maintenance may be undertaken by the Parish Council, there is no provision for payment, and with the limit of expenditure, Sec. 10 (ii.) it amounts to a prohibition of the work being done, unless the words of the Bill may be read as authorising a payment from the County Council.

The most recent case on Highway Law is that of Eyre and the New Forest Highway Board (1892), in which it is laid down that the inhabitants of a parish have not only no duty but no right to repair a road informally dedicated since 1835, and it is desirable that the present Bill should be so amended as to confer on District Councils a power to adopt the liability to repair at large as that now possessed by an urban Authority.

Again, the powers under the Highway Acts of the inhabitants of rural parishes in vestry assembled are transferred to the Parish Council. By Sec. 24 (1), which incorporates Sec. 144 of the Public Health Act, 1875, they are transferred to the District Council.

As showing the difficulties created by this dual transfer, suppose an owner wishes to dedicate a new highway to the public, under Sec. 23, Highway Act, 1835, the proposal will be made to the District Council as Surveyors. If it were held that the powers of the vestry were transferred to the Parish Council, it would then become the duty of the District Council to remit the proposal to the Parish Council, and if the Parish Council deem such highway not to be of sufficient utility to the inhabitants of the said parish to justify its being kept in repair at the expense of the said parish, the dedication owner may be summoned by the District Council to appear before the justices at special or petty sessions, "and the question" as to the utility, as aforesaid, of such highway shall be determined at the discretion of such justices. On the other hand, if the District Council exercise the power of the Vestry they will have full discretion to determine the question of public utility, as urban Authorities now have in like cases.

Further, by the Local Government Act, 1888, Sec. 11 (4), rural District Councils may be called upon to undertake the management of main roads, another argument in favour of the new Surveyors being men having a recognised qualification.

From an experience of twenty years in the work of a rural district, the author is very strongly of opinion that the dividing line in the powers conferred upon urban and rural District Councils should be all but abolished. The conditions of healthy life in the country are of equal importance with those in the towns. There is one place in Lancashire (Childwall), with thirty-two houses and 199 population (census 1891), which has all the powers of a Local Board with 30,000 persons, simply because they adopted the Act of 1848, while many villages in rural districts, with populations of 1,000 and over, cannot undertake one of the most elementary duties of urban life without special consent of the Local Government Board, and this broad distinction exists in nearly 13,000 parishes in 574 Rural Sanitary Authority districts.

The Bill wants recasting. The clauses relating to Parish Meetings and Parish Councils are so

mixed up that it is difficult to separate them, and even Mr. MacMorran, Q.C., eminent as he is in "Public Health" Law, is obliged to confess that some of the clauses are unintelligible and *redundant*.

Before closing this paper, the author ventures to make the following suggestions, in the hope that the Council will see its way to make representations to the President of the Local Government Board, with the view of inducing him to so amend the Bill that it may be more in harmony with the requirements of the present day:—

1. The following sections, *inter alia*, of the Public Health Act, 1875, to be incorporated:—42, 43, 44, 45, relating to scavenging; 149, vesting of streets, &c., in urban authority; 157, power to make bye-laws respecting new buildings; 158, as to commencement and removal of work contrary to bye-laws; 159, what is to be deemed a new building; 160, Towns Improvement Clauses; 161, lighting streets; 171, Towns Police Clauses Act, 1847.

2. Part III. of the Public Health Acts Amendment Act, 1890, to be compulsory, and not optional, as at present.

3. Rural Sanitary Authorities shall appoint as Surveyors men having an acknowledged qualification. Such Surveyors not to be removed without sanction of the Local Government Board.

4. Surveyors to be compelled to report to the Local Government Board annually, and to point out any case where the District Council fail to carry out any part of their duties.

5. Sec. 120, Local Government Act, 1888, to be inserted.

In the discussion which followed,

Mr. Massie (Wakefield Rural Sanitary Authority) said he was sure all Surveyors to Rural Authorities must feel that the Bill as at present proposed was one which could never be accepted as a settlement of their position. He agreed with Mr. Godfrey that a great opportunity had been lost in not separating the Poor Law from sanitary work. He had spoken to nearly every member of his Authority, an Authority having under its control a population of nearly 40,000, and they said it was almost impossible to undertake Poor Law and sanitary work. Another matter which he thought utterly wrong was the proposal to allow the representation of townships to continue unchanged. In the Wakefield district there were two townships of fifty or eighty population, each returning one member; and there was one large township of 12,000 returning only two members, so that those two small districts practically nullified the representation of 12,000 persons. Then in the West Riding there were twenty-four Local Boards with populations of less than 2,000, with full urban powers. In his district, with a population of between 35,000 and 40,000, they had to go begging cap in hand to the Local Government Board for every power. Another serious matter affecting their future was that under this Bill, County Councils had power to alter existing districts. He referred more particularly to the proposal that in future every parish should be the centre of a district. He totally disagreed with that, for two reasons. Under the Bill, the County Council, subject to the sanction of the Local Government Board, could take 10,000 or 12,000 persons from his district and add to the City of Wakefield or Borough of Morley; and then, secondly, the parish boundary was not always the most suitable boundary for a district. The County Council for the West Riding of Yorkshire had passed a resolution in favour of the ridge land of the watershed being the boundary of the parish. In conclusion, he reiterated the hope expressed by Mr. Godfrey that the Council of the Association would watch the future progress of the Bill with the greatest attention.

Mr. Hooley (County Surveyor of Nottinghamshire) said that as one who suffered from the connexion of Rural Sanitary Authorities with Boards of Guardians he would like to endorse Mr. Godfrey's remarks as to the inadvisability of mixing up Poor Law relief with sanitary work. Pet schemes of his own which had passed committees of the Rural Sanitary Authority had been quashed on going before the Board of Guardians, on the ground of expense.

Mr. Davis (Aston Manor) said he entirely agreed with Mr. Godfrey that the Bill needed recasting. As representing one of the four largest Urban Sanitary Authorities in the country he had carefully read the Bill to see what it would do for them, and all he could see was that they would be called a District Council.

Mr. Campbell (Stratford-on-Avon) suggested

that it should be an instruction to the Council of the Association to take the Bill into their consideration and make such representations to the Local Government Board as they saw fit.

Mr. Savage (East Ham) said that so long as the Local Government Board drew Bills of this kind without the advice of the Association they would have intricate and muddled legislation.

The President, in closing the discussion, said it was the first time the Association had had an opportunity of discussing a Bill before it had actually become an Act of Parliament, and he thought Mr. Godfrey had done very good service in this respect, as it would give an opportunity for Members of Parliament to see the difficulties with which they were confronted, and enable them to make such alterations in the Bill as would be necessary to provide for its proper working. He assured Rural Surveyors that the Parliamentary Committee, with the assistance of Rural Surveyors, would give this Bill their very careful consideration.

A vote of thanks having been accorded to Mr. Godfrey for his paper, that gentleman briefly replied.

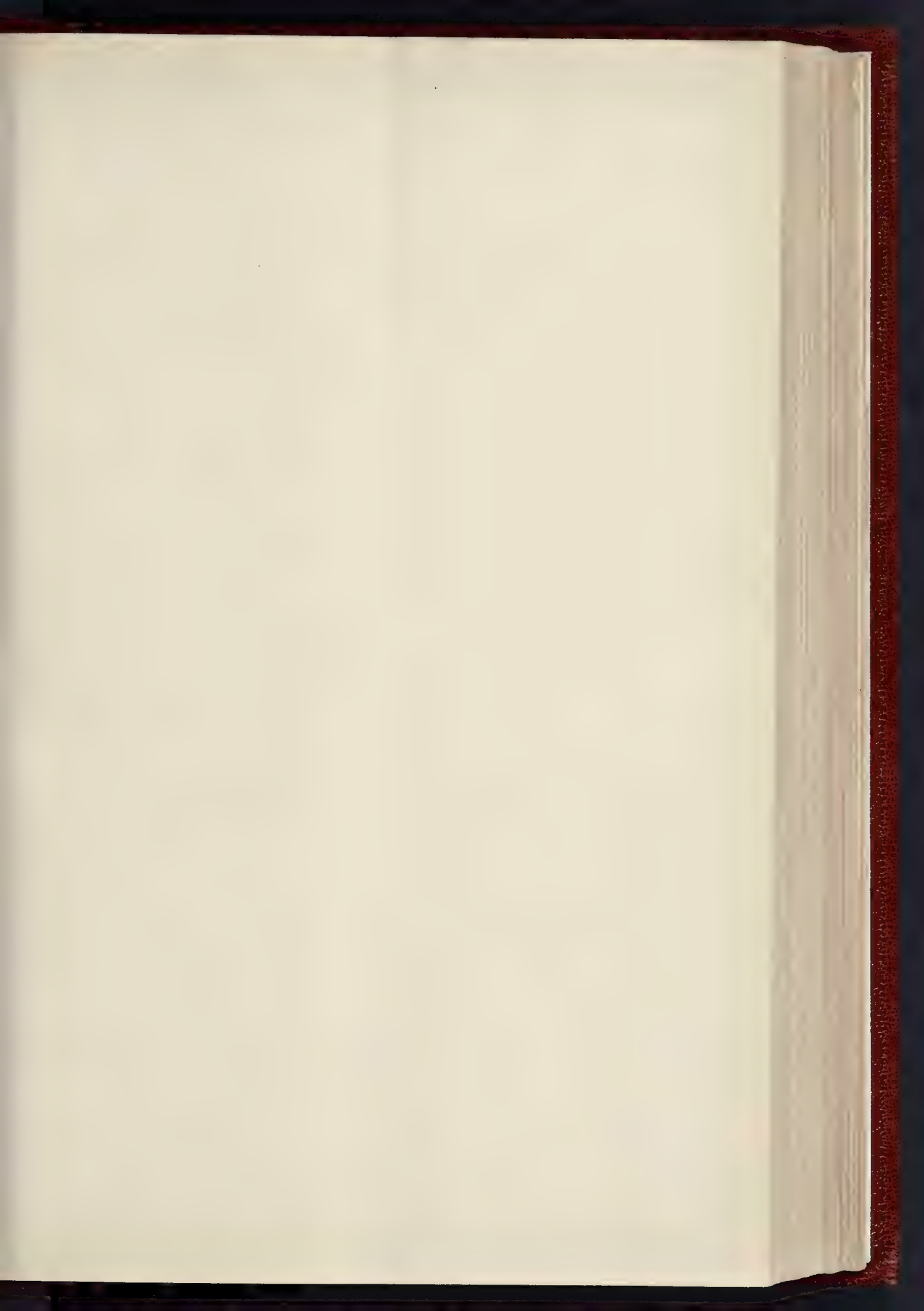
Electrical Mains and Methods of Laying Them.

Mr. C. H. W. Biggs, M.I.E.E., read a long and interesting paper on this subject, in the course of which he said:—

The members of this Association are responsible for the condition of the roads, streets, and pavements of the kingdom—hence, whatever interferes with these must be considered of interest; but in addition to the mere maintenance of streets, one of the most onerous duties of the Borough Engineer is the giving advice to his Council in matters electrical. As one who is doubly interested in these matters—on the one hand from the municipal, and on the other from the electrical standpoint—I am naturally anxious to elicit information as to the exact conditions each party requires fulfilled. If the municipality—as I hold it ought to do—undertakes the production and distribution of the means to provide for the artificial illumination of the district over which it holds sway, it will have full and complete control of the generating stations and the system of distribution.

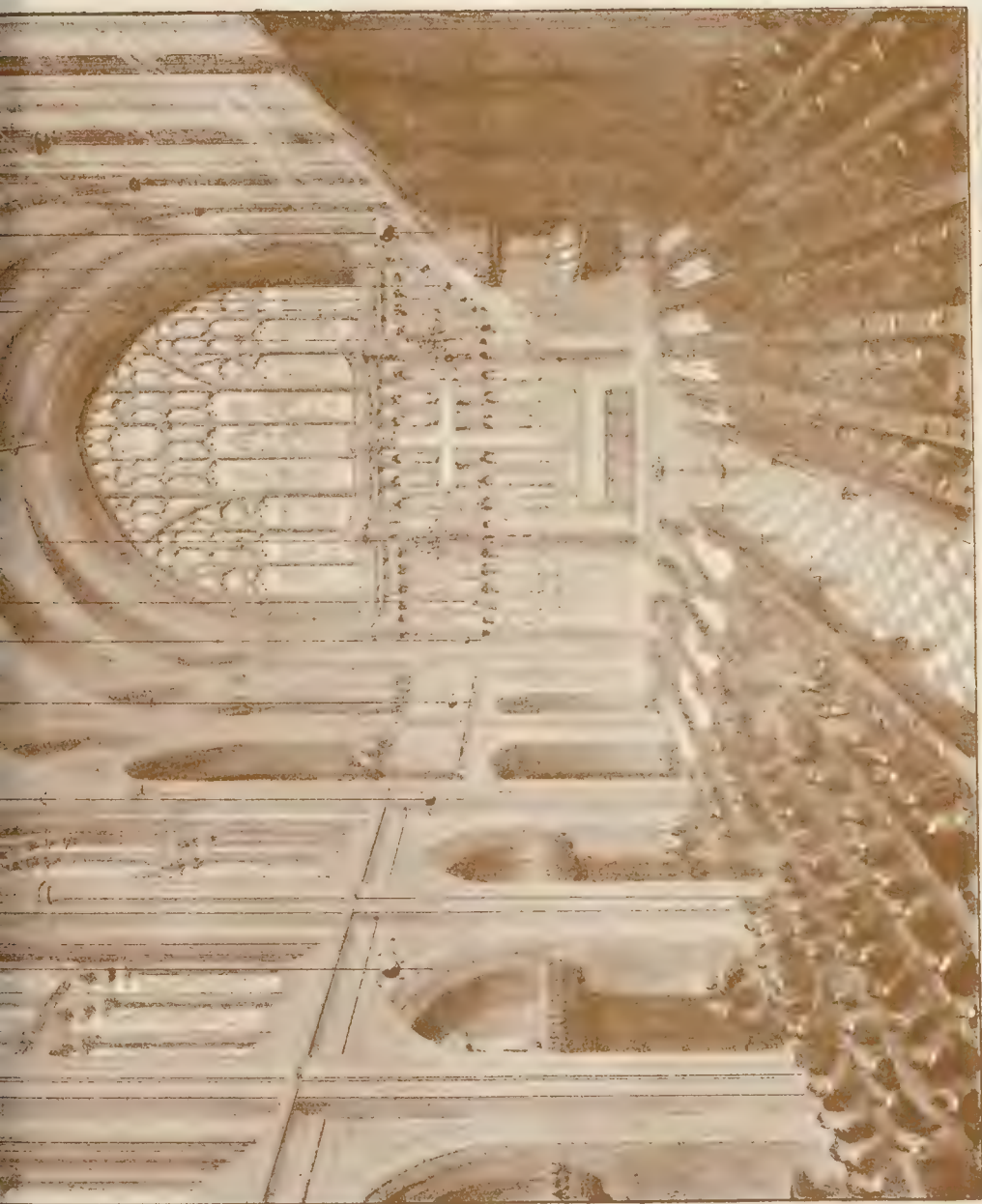
With the generation of electrical energy I have little to do in this paper, except to assume that it will be generated either on the high or the low pressure system. If generated on the high pressure system, it may be either to give continuous or alternating currents. If the alternating system is adopted, most probably a different kind of main will be used than if on the continuous current. The reason of this may be explained. According to the researches of Lord Kelvin, Oliver Heaviside, and others, the phenomenon which we call current in alternating current work affects only the external part of the conductor. The slower the alternations, the greater the sectional depth of the conductor that takes part in carrying the current; the more rapid the alternations the less the depth of conductor so acting. Hence the view has arisen of late years that the conductor is more of a directrix than anything, and given sufficiently rapid alternations, the action is a mere surface action between the dielectric and the conductor. Thus the conductors for alternate currents are sometimes hollow metallic tubes—in fact, copper tubes—in order to obtain a large surface area. Mr. Ferranti was, I think, the first to arrange the outgoing and the incoming tubes concentrically in his mains from the Deptford generating station to the Charing Cross and other districts supplied from Deptford.

It will be best to avoid as far as possible the discussion of purely electrical matters, except so far as they bear directly upon the object of this paper. Assume, then, that we wish to generate a given quantity of electrical energy and utilise it at a certain point. What difference will it make to our mains if it is generated under high pressure or under low pressure? The heat developed in a conductor is given by the well-known formula C^2R —"current squared" \times "resistance"; from which it is seen that a small increase of current may mean a considerable increase of heat. We neither want our mains melted, nor in fact, made hot; we want the heat evolved at the lamps, for elsewhere it means loss. The heating of the conductor increases the loss in another way, as it also increases the copper resistance. By generating under high pressure we obtain our quantum of electrical energy with little current, the energy being represented by the product of "current" \times "pressure." In the formula $C, E, C =$ current; $E =$ pressure. Increasing the pressure means decreasing the current, and a small current



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INTERIOR OF NEW CHAPEL, CHELTENHAM COLLEGE. MR. H. S. J. DESIGNER, ARCHT.

s a small conductor, which, as copper is ally used, means a saving of copper. On the other hand, the current will traverse any road in find, and it goes over these roads in sties inversely to the resistance to its pro- these roads offer. In our operations we it to go over a particular road, and not der away in other directions, being thereby for our work, not to mention the danger to both life and property from its g where it is not wanted. With high ure, then, we have to be exceedingly ful as to the insulation of the con- or. Hence, while we gain by saving per, we lose something by having to use more ly insulation. Mains must be constructed so o avoid loss from heating and loss from ge. There is still another point to which our must be directed. If we use rical energy for lighting purposes, we want current to be as large as possible at the point e, because its value for the object in view es as its square. The electrical energy may generated at a high pressure and a small rent, but it is used at a lower pressure with er current. If our apparatus were perfect we ht convert 2,000 units of pressure (called ts) \times 2 units of current (called amperes) into equivalent energy: 100 volts pressure \times amperes current. The piece of apparatus for h conversion is called a transformer. Some advocates for high pressure would supply a transformer to every house; others prefer a trans- former to a group of houses. Whichever plan be- opted, the cost of transformers has to be con- sidered. This extra piece of apparatus must also d to the cost of maintenance. Further, unless e transformer be absolutely cut out of the cut when it is not required in the production light, it is constantly using up more or less rent in order to keep the iron core magnetised, hich is another source of loss.

Summarising, high pressure requires less copper e the mains, but more and better insulation. e requires the use of transformers, either in every house or at sub-stations for a group of ouses. These transformers have to be paid for initially and have to be maintained; they also ead to a smaller or greater constant loss of current. The great advantage of high pressure is in enabling the central station to be erected in places where land costs less than where the position is more rigidly defined, where fuel and water are more cheaply obtained, and other similar advantages. Low pressure working requires the central station to be at hand (according to the calculations of Messrs. Crompton and Wright, the distance must not exceed from 2,000 to 2,500 yards), and it needs more copper in the conductors. As generally adopted, low pressure (the limit of which is 500 volts) also requires transforming, but in a different way to that adopted with high pressure.

The author then went on to describe the three-wire system, and the bare-wire system, now being carried out by Mr. Crompton at Hove. He also dealt in great detail with the construction of concrete culverts, drains, insulating gear, junction and house-service boxes, and other matters; but his remarks on these subjects, being very fully illustrated by diagrams, cannot be intelligibly summarised in the absence of the diagrams.

In the discussion which followed,

Mr. H. P. Boulnois (Liverpool) moved a vote of thanks to Mr. Biggs. He said the paper would be exceedingly useful, not only to those who had charge of electric stations under Corporations, but also to those who had to watch over public companies. Mr. Biggs had wisely dealt, not with the generation of electricity at the works—with which as Municipal Engineers they had little to do—but with the best means of conveying the electricity from the generating station through the streets to the consumer. As to the cost given of laying mains, he wished to ask Mr. Biggs if he had included anything for the proper insulation of the cables; and whether this did not enter largely into the question of maintenance. Mr. Biggs had given three methods of insulation, but he had omitted to mention a new system—new in this country, though largely used in America—that of prepared paper. The paper, soaked in oil, was wound round the cable and then encased in lead, as in Messrs. Siemens's process. With regard to the electric conductors at Hove, Mr. Biggs gave them the specification under which they were laid, but not the depth of the mains. He took it they would not allow any of these wires to be laid within a few inches of the footpath. He had prepared standard conditions for Liverpool under which they compelled the

company there to lay the electric light mains and services through the streets. The feeders and distributors had to be laid under foot-ways a depth of 1 ft. clear, and under carriage-ways 2 ft. and 2 ft. 6 in. in the clear. With reference to the feeding and service boxes it was essential they should be hermetically sealed to prevent moisture getting into the boxes. If moisture got into these boxes they would have a short circuit, or a fire, or an accumulation of gas, which went off with an explosion somewhat terrifying to passers-by. They had had two or three of these explosions in Liverpool, and the police were quite alarmed by them. They had now replaced the old boxes with new ones fitted with porcelain receivers, into which any moisture ran. These receivers were inspected once a month, and any moisture which might have found its way inside was wiped out. Since this had been done they had had no further trouble from explosions.

Mr. Silcock (King's Lynn), who seconded the vote of thanks, said there were one or two points upon which he wished for further information. One was as to a system of oil insulation which had been introduced. Mr. Boulnois had mentioned a paper insulation, which was practically the Ferranti system, but there was also an oil insulation in which the cable was enclosed in oil, and had no solid casing at all. The depth of the insulating channels was also an important point, especially in connexion with the Crompton system. The bare-copper cables strained in channels took up a great width and depth of the roadway in large towns, where there were a number of pipes for gas, water, and hydraulic power laid under the roadways, and it very often happened that sufficient space could not be obtained for channels on the Crompton system. He believed that at Bradford they had laid covered cables with merely a plank over them to prevent workmen on the roads picking or putting a shovel into them. That was the most simple method of cable laying, but whether it would be permanent and efficient remained to be seen.

Mr. Cox (Bradford), said that the information given in the paper would have been of great value to Bradford if they could have had it before their cables were laid. The cables were laid under the ridge of the causeway without any protection beyond a $\frac{3}{4}$ -in. board laid on the top as a sort of warning to any excavator who had to dig there. Of course the wire was insulated with a covering of composition. They had found from stern experience that it would have been very much better to have had a channel or culvert either in iron or brickwork, and they would have saved a good deal of money in consequence. The streets had had to be taken up twice, and they were having to take them up again to introduce the three-wire, or, perhaps, the five-wire system. A discussion was taking place between Mr. Shoolbred and Mr. Baynes as to laying the three- or five-wire system. The Committee, in their dilemma, submitted the matter to Lord Kelvin, who supported Mr. Baynes in the three-wire system, but the Committee had asked his lordship to visit Bradford, and go over the system before finally deciding. Whether the three- or five-wire system was adopted, there would be a better plan for laying the cables under the street, so as to avoid the expense and inconvenience of taking up long lengths of mains.

Mr. Hall (Cheltenham) said that the difficulty of fixing a depth for laying cables was that in some towns the cellars were not only under the houses, but under the streets.

The vote of thanks having been accorded,

Mr. Biggs, in reply, said he believed the system of oil insulation was introduced by Mr. Brooks, of Philadelphia. He had not mentioned the system because it had not been introduced to any extent in England. With regard to insulation by oiled paper (referred to by Mr. Boulnois), he did not think it had come into use in this country. [Mr. Boulnois: Yes.] Not to any great extent; and he did not like to take everything for granted that came from American sources. Mr. Ferranti used waxed paper, which was a paper system, though a modified one. With regard to the depth of the cables in the roadway, he thought that would vary with the number of wires, to a considerable extent. A depth which would do for three wires would not do for five, and he thought Mr. Crompton had to modify his system in regard to the requirements of each particular case. There was great difficulty in the way of fixing any depth for cables, owing to the number of pipes laid under the roadways.

The President, in closing the discussion on this paper, said this question of electricity was one

which in future would demand a great deal of attention from them as municipal engineers. They were upon the very fringe of electricity at present, but at any time they might be called upon to advise their Corporations—not upon some great installation, for which they would call in an expert electrical engineer, but upon the laying of the cables in the streets. Mr. Biggs's paper gave them a great deal of useful information upon this point.

Mr. Robert Hammond, M.Inst.C.E., followed with a paper on "Municipal Electricity Works," but we must defer notice of this and of some other papers until our next issue.

THE SURREY ARCHÆOLOGICAL SOCIETY.

GUILDFORD, Compton, and Loseley were the places visited by the members of this society this year, and on Wednesday, July 26th, about one hundred of them and their friends assembled at Guildford. Many arrived by early trains, and inspected the castle and other buildings of antiquity, such as Abbot's Hospital, but as these were visited by the Society in 1886, and described in the *Builder* of August 14 that year, they need not again be referred to, further than to say that since then the castle and grounds have come into the possession of the Corporation of Guildford, and the grounds have been laid out, and many improvements made, notably a circular iron staircase constructed to the top of the castle keep, which works have been executed under the superintendence of Mr. Henry Peak, architect, Guildford.

Carriages were in waiting at 1 p.m., and took the party to St. Catherine's Chapel, where Mr. Ralph Nevill, F.S.A., read a paper. He said these ruins stood on the well-known ancient Pilgrim's Way, and just above a ferry over the river Wey; the pilgrims passed through here from Southampton to the shrine of St. Thomas à Becket at Canterbury. The chapel was no doubt built early in the fourteenth century, and it would be noticed from the remains of the springing of the traceries of the windows that they must have been similar to those in the Chapel of St. John the Baptist at St. Mary's, Guildford. From St. Catherine's the members and visitors drove on to Compton, and took light refreshments at the "Harrow" inn.

Mr. J. Lewis André, F.S.A., read a paper inside Compton Church, which, he said, was mentioned in Domesday Book; it was famous for its double sanctuary. Over the inner chancel arch was a kind of gallery, said to be the oldest in England, and which will be found illustrated in "Parker's Glossary of Architecture," and thus described:—

"At Compton Church, Surrey, there is a vault over the eastern part of the chancel, on which is an upper floor, which in fact is a gallery, and has an open front of wood work, which, like the vaulting, is of Transition character from Norman to Early English (about 1200); this was used as a chapel, and had an altar in it, and the piscina still exists in the south wall."

There is a plain chest made of cedar, lately used for a coal-box. A fenestella is also illustrated and described in "Parker's Glossary." Mr. André also described the monuments, registers, and plate; the latter will be found illustrated and described in Vol. x. of this Society's "Transactions," by the Rev. T. S. Cooper, one of the hon. secretaries.

From Compton Church the party proceeded to Loseley Hall, and were cordially received by Mr. More-Molyneux, the proprietor. Here Mr. Ralph Nevill read another paper. The Manor House was built by William More in 1568; he was an important person in Surrey, and was alternately Member for Guildford and the County, owner of the pocket borough of Haslemere, and was twice Sheriff of Surrey. The house took six years to build, and was erected for what now appears the ridiculously low sum of 1,560*l*. There were portraits of James I. and his Queen, Edward VI., Mary Queen of Scots, and Queen Elizabeth. The bedrooms occupied by James I. and his wife while on a visit here were inspected. The company soon after returned to Guildford, where, after a collation at the "White Lion" Hotel, they dispersed.

Mr. Mill Stephenson, hon. sec., announced five new members.

THE DONALDSON SILVER MEDALLIST, 1893.—The highest Certificate and Prize—the Donaldson Silver Medal of the year—has, we are informed, been awarded to Mr. Arthur Baldwin Hayward (son of Mr. C. Forster Hayward, F.S.A., F.R.I.B.A.) for his studies in the Fine Art Course of Architecture at University College.

Illustrations.

ST. GILES'S CATHEDRAL, EDINBURGH.*

THE Cathedral of St. Giles is a building that externally is seen to best advantage at a distance. Its crown then dominates that part of Old Edinburgh with fine effect. A nearer view that reveals the whole church is disappointing, for there is little to see but uninteresting symmetry and feeble detail expressed in smooth ashlar work; and what is lacking in architecture is not condoned for by antiquity, for all visible, the tower excepted, is of this century's date.

As a Cathedral, St. Giles's must be accounted modern. Originally simply the parish church, raised to collegiate rank in 1467, only in Charles I.'s time did the "gude toune" become the seat of a bishopric and so attain to city dignity. All this notwithstanding, when the history of the church is known, it is marvellous that anything of architectural interest should have survived, and one must be thankful for what remains. The interior makes some amends for the poor outside, and shows much of interest and intrinsic beauty. The restoration effected within the last twenty years removed the various partitions that had been permitted to enclose parts now thrown open, and so restored in some measure of integrity, not merely to the city a place of worship, but to the nation an historical monument.

St. Giles, the patron, was a sixth-century saint, a native of Athens. Only two other churches in Scotland bear his name, Elgin and Ormiston. In England no less than 146 are said to be dedicated to him. The hind that was the saint's companion appears as one of the supporters in the city arms. There are records of a church in Edinburgh as early as the ninth century, belonging to the monastery of Lindisfarne, Holy Island, Lothian then being included in the province of Northumbria. In 1120 a new church was erected by Alexander I., an interesting relic of which, a doorway, survived down till 1797, when, during some alterations, it was wantonly destroyed. An authentic illustration shows it to have had a semi-circular-arched head of three orders, richly carved, all of the customary Norman type. This doorway had escaped the destruction which overtook the church in 1385, when Richard II. ravaged the land, burning Melrose and Dryburgh Abbeys, as well as the town of Edinburgh and its church. At that time, however, the Abbey at Holyrood was spared. Another and larger church was at once begun. Some may believe that incorporated within the present piers of the tower there are portions of Norman work, but it is unlikely: certainly nothing of such a date is visible, and during the most recent operations, when the whole floor of the church was raised, no trace of old foundations even were met with. The fourteenth-century church, then, had a nave of five bays, transept, tower over crossing—though not as now seen, for it is a century later—and a choir of three bays, the south aisles of both choir and nave being the wider; and all was stone-vaulted. The peculiarity of the roof of this date over the choir aisles may be noted—a kind of pointed barrel vault. There appears to have been no western door. Before this original scheme could have been completed, an enlargement was made. Five chapels forming an additional south aisle to the nave were begun in 1387. There is still preserved the contract between the provost and community of Edinburgh and the three masons who undertook the work, which is interesting both as being about the earliest specimen of Scottish prose, and also for its fine generality of description, particulars not condescended to: the masons "Shall make and vault five chapels . . . in a straight line, with the great pillars of the steeple, vaulted in manner and masonry as that above St. Stephen's altar, Holyrood, the which pattern they have seen. . . . Shall make in each chapel of the four a window of three lights, in form masonlike . . . and the fifth chapel . . . with a door in as good manner as the door standing in the west gable there [Holyrood]. The community finding all scaffolding to the work, the foresaid masons doing their craft to the work truly, without fraud, as true men ought to do." The doorway here mentioned was shifted in 1829, and again in 1883, when it became the royal entrance. Originally it stood within a vaulted porch, above

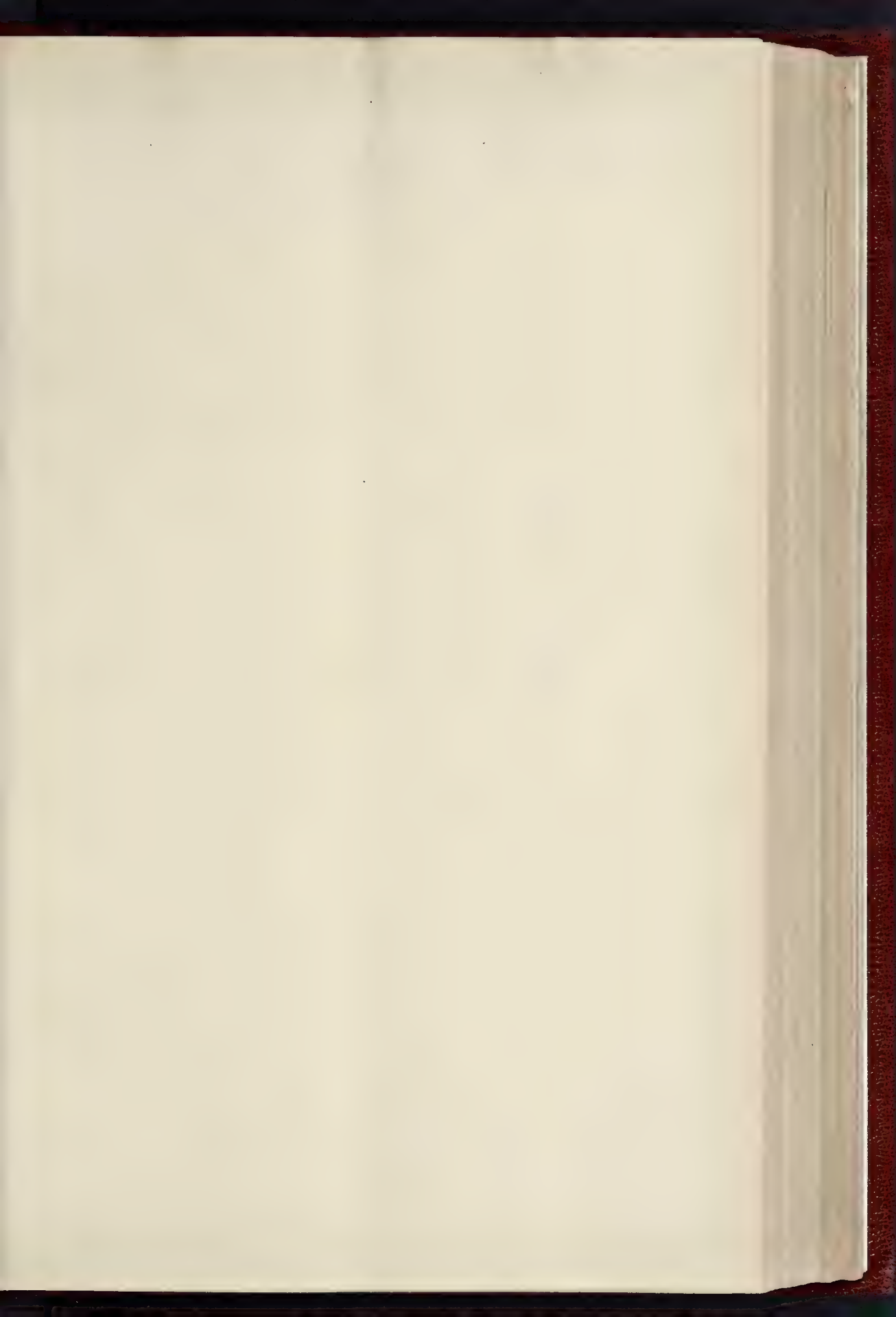


which was a re-vestry, lit by an interesting oriel window somewhat similar to that at St. Michael's Church, Linlithgow. A modern reproduction may now be seen in the west gable of the south aisle. These chapels appear to have been vaulted similarly to the nave aisles, but their roofs were demolished in 1829, when the two westernmost chapels were wholly lopped off. As well as on the south, north of the nave aisles two chapels were added by the Duke of Albany and Earl of Douglas, both implicated in the murder of the Duke of Rothesay. This portion remains intact, the windows only being modern. Adjoining was the Norman porch; overhead of it was an apartment reached by a stair now removed, but the door that gave access to it remains as a shallow recess in the aisle wall. About the same time, and eastwards of the Norman porch, other two chapels were built: the dedication of one is unknown: St. Eloi was the patron of the eastmost. Both, it may be said, were destroyed, for it is little more than the site that remains to the St. Eloi's chapel of to-day; it was enlarged in 1829, when its com-

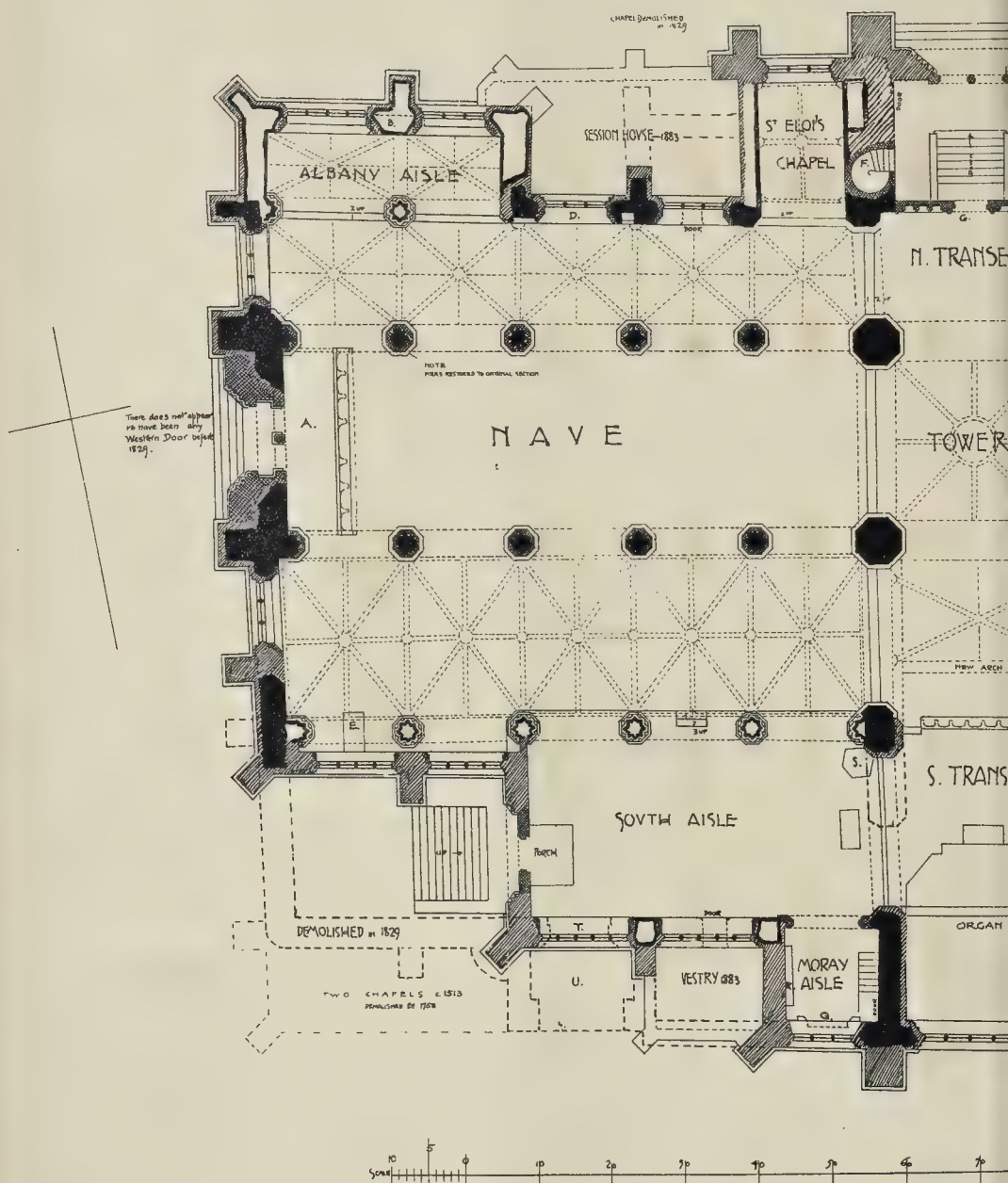
panion was destroyed; in the new vault are preserved some old bosses.

About 1460 the choir was lengthened, the clustered pillars and their responds, higher nave arches, and the richer vaulting of the aisles clearly marking the change. At the same time, the whole vault of the choir central aisle was removed, a clearstory built, and the richer roof erected, still extant; the bosses here—as, indeed, all through the church—are very rich. The added pier on north side is called the King's Pillar, certain heraldic indications on the shields of the King, his Queen, and the infant Prince, carved in the capital, marking it as the memorial of the untimely death of James II. (killed in 1460 by the bursting of a cannon at Roxburgh), erected by his widow, Mary of Gueldres. Another important addition was an aisle south of the choir aisle, erected by the grateful townsmen to the memory of William Preston, who, having in France become possessed of a precious relic—the arm-bone of St. Giles—on his death bequeathed the same to the church. He himself was afterwards

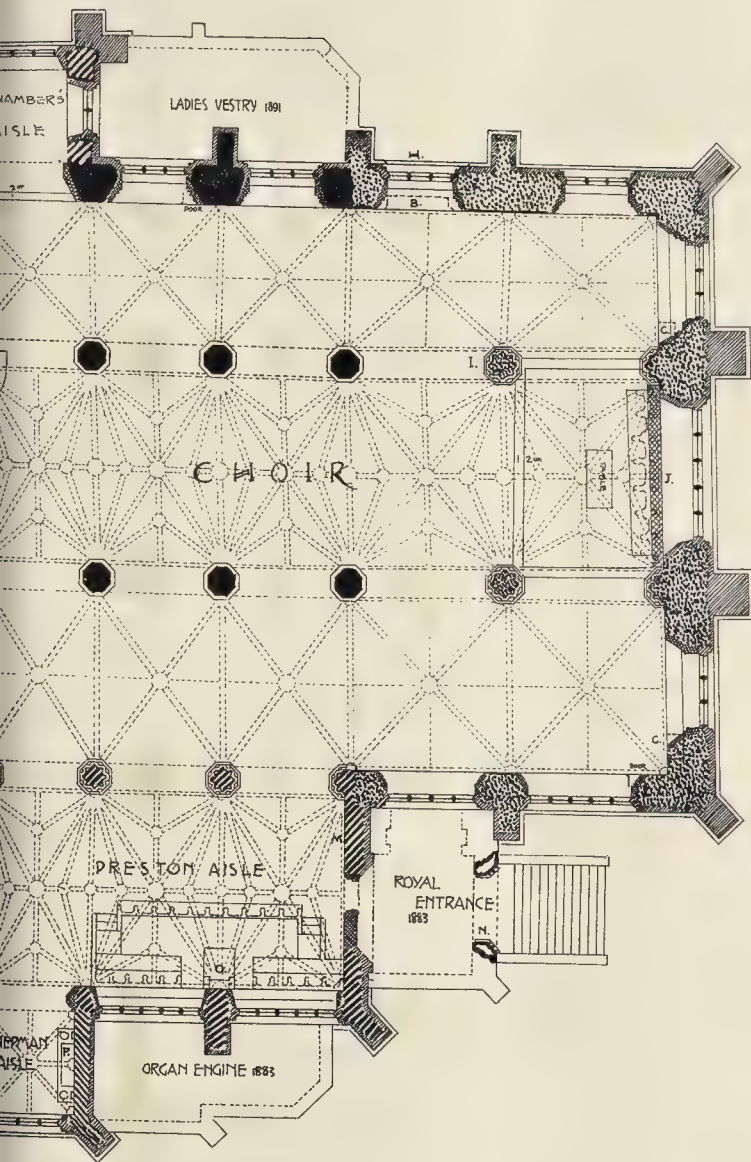
* The series of illustrations of the Ancient Cathedrals of Scotland, which was begun in our issue of July 1, will be continued in the first number of each month, until December next. Particulars of this, and of the series of "Cathedrals of England and Wales," which ended in June last, will be found on page xx.



ST GILES' CATHEDRAL EDINBURGH



Chambers Aisle closed up in 1891
and Squire Vaulted



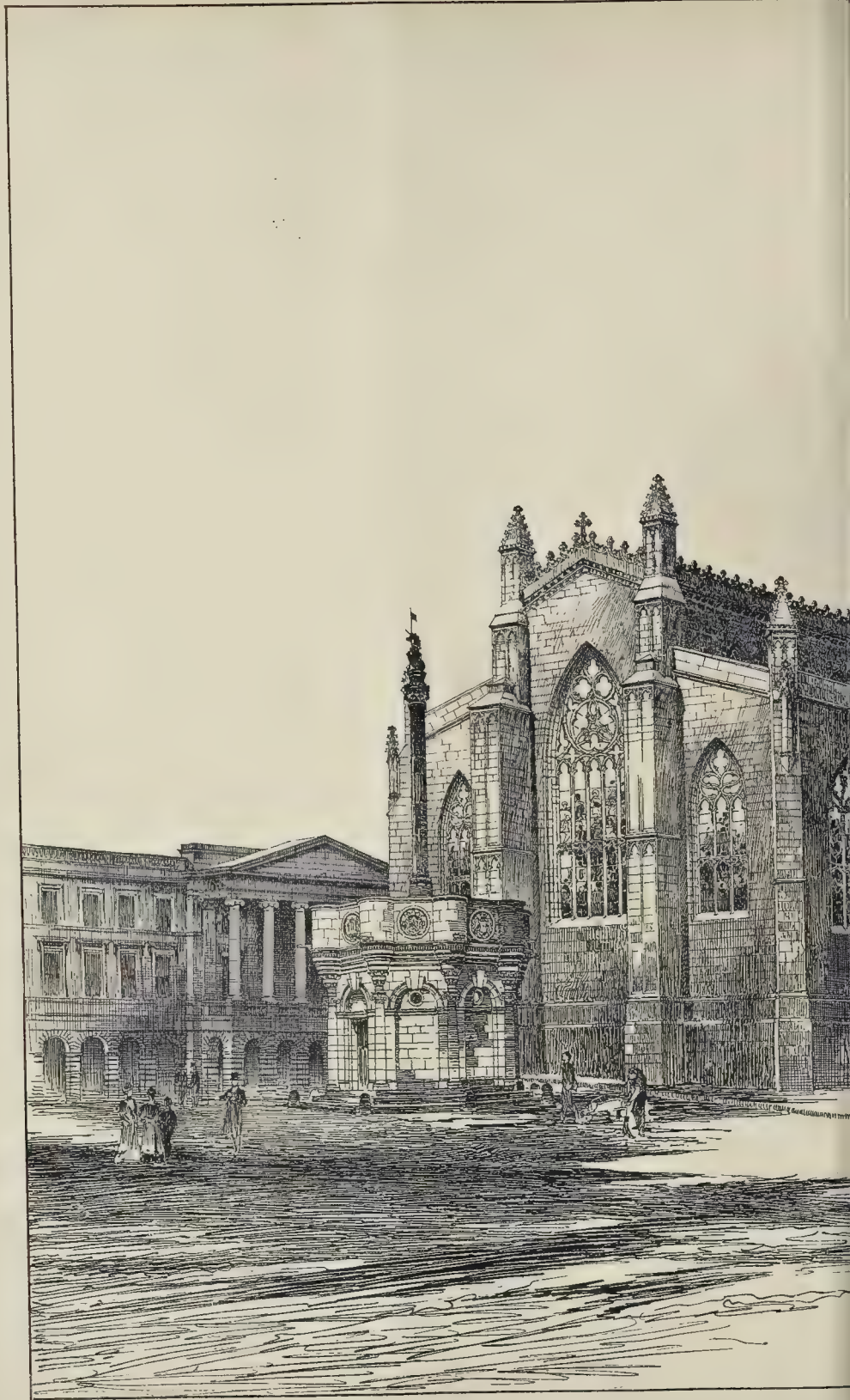
REFERENCE

- A Porch
- B Arched Recess
- C Ambry
- D Site of Norman Door, removed 1797
- E Font
- F Stair to Tower
- G Stone Screen
- H Moor to Hapery/Merchiston
- I KING'S Pillar
- J Stone Reredos
- K Pulpit
- L Desk
- M Moor to L^d Justice General, 1740-1745
- N XV cent. Door, re-erected
- O Royal Pew
- P Moor to Montrose
- Q XV cent. Monumental Slab
- R Moor to Regent Moray
- S Old Pulpit
- T Site of XV cent. Door
- U Porch, now destroyed with stair in corner to reach vestry above.

	1385
	1387-1416
	1460
	1460-6
	1513
	1829-33
	1871-73

Taken from a Plan prepared by Messrs Hay Atterderson
Circular Edinburgh



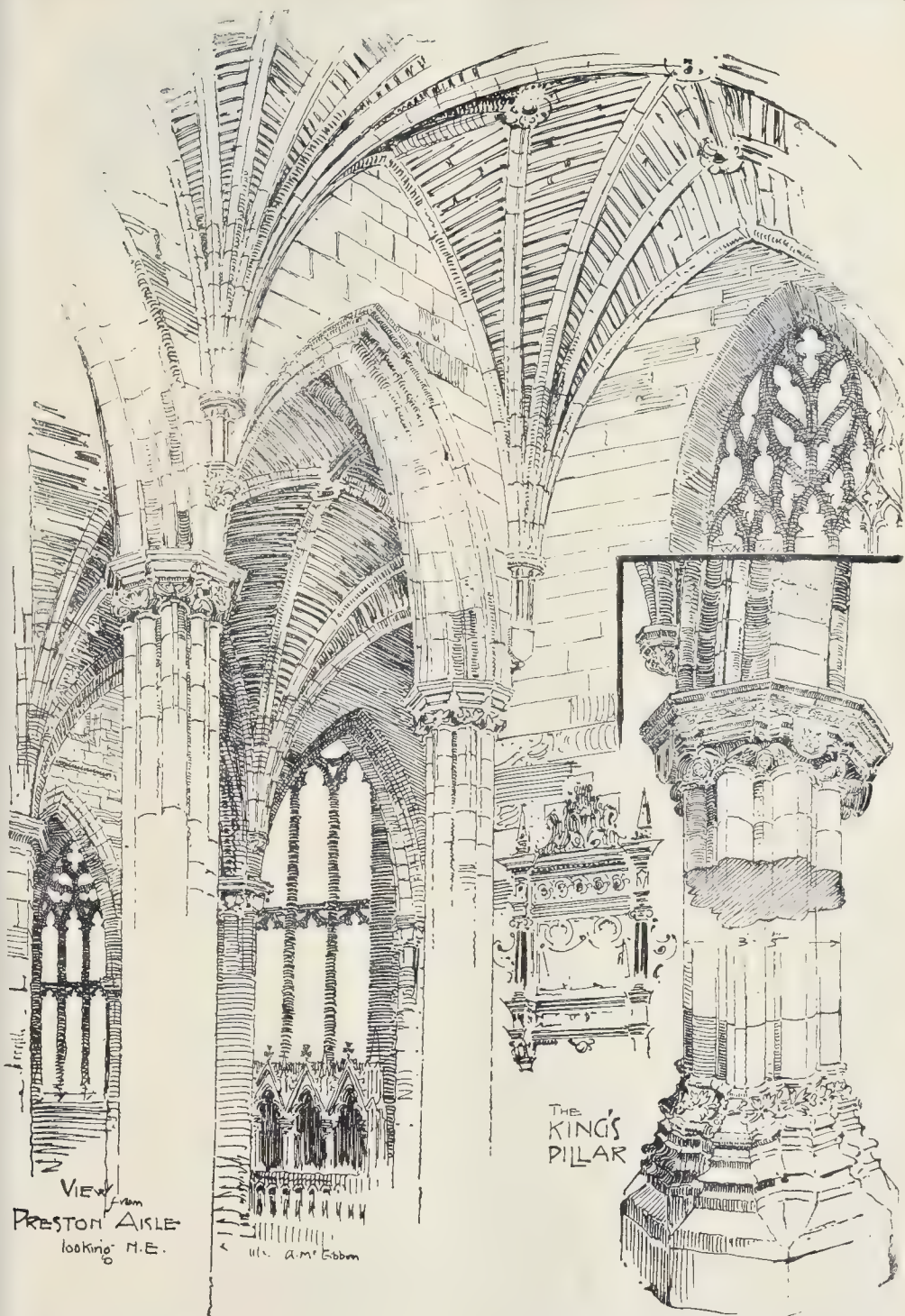


THE ANCIENT CATHEDRALS OF



—DRAWN BY MR. ALEXANDER MCGIBBON.
EDINBURGH

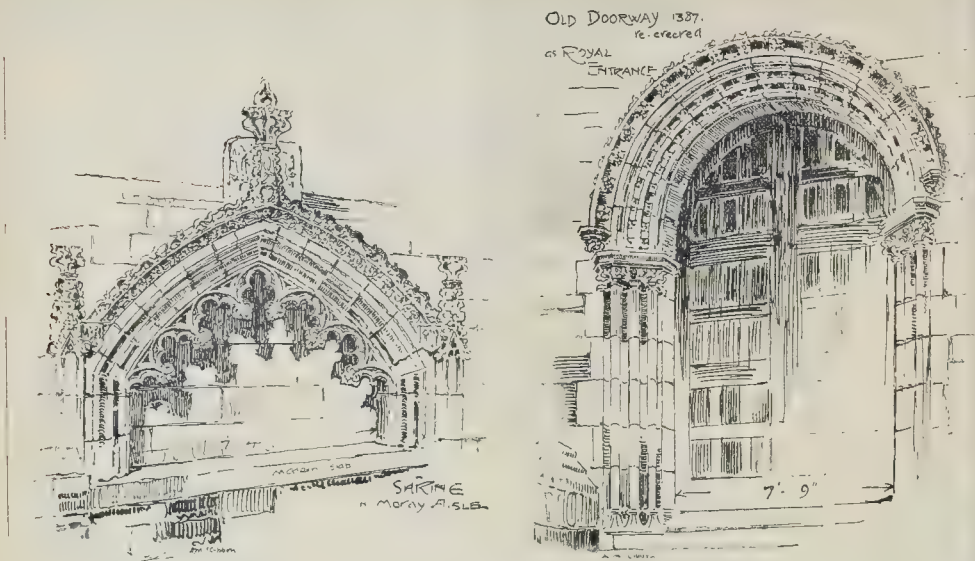
PHOTOGRAPH BY MR. ALEXANDER MCGIBBON. 11, N. STREET, EDINBURGH.



buried in the aisle named after him, and a commemorative brazen tomb erected. The vaulting of this aisle is very graceful, the long thin stones employed, with strongly-marked joints, helping greatly the appearance. In 1487 St. Giles's became a collegiate church, with an

establishment similar, and not much inferior, to that of a cathedral. It consisted of provost, curate, sixteen prebendaries, sacristan, beadle, minister of the choir, and four choristers; this in addition to the chaplains of the various altars, at this time numbering thirty-six. The

upkeep of these was largely from the contributions of the various Trade Guilds, each craft having its particular altar, situated either in one of the many built chapels, or having one formed by a space railed off. Still further dignity was conferred on St. Giles's when, three years later, it was declared



independent of any ecclesiastical authority in Scotland, and subordinate to Rome alone. Between 1485-95 the tower was built. The crown seems to be a feature more favoured in Scotland than elsewhere. St. Nicholas, Newcastle, is the only English example known. The other specimens are King's College, Aberdeen, and a rather unimportant one at the Tron, Glasgow. Other and finer examples there were at St. Michael's, Linlithgow, and at Haddington, but both have perished. This of St. Giles's has eight ribs, rising from a tower 30 ft. square, with walls 4 ft. 6 in. thick. From the floor of the church to the top of the stone lantern is 142 ft. 6 in. On the east side a turret stair is carried up, and adds to the picturesque quality of the whole feature. The north transept did not then extend as now beyond the line of aisle wall; a deep vaulted porch was the principal entrance, with an exposed turret-stair to the tower. The south transept was extended southwards to its present extent, but of the five bays of its vaulting one alone remains, the others were removed when the clearstory was added in 1829. Between this transept and the south porch lay the Caithness aisle, now represented by the Moray aisle, so-called. The real Moray aisle was the extension of the south transept, against the west wall of which stood, originally, the tomb of the good Regent. Only the brass plate of this remains, set up on the modern monument to his memory. In this now vanished Caithness aisle stood the shrine supposed, from the emblems of the Passion carved upon it, to have belonged to the altar of the Holy Blood, now re-erected eastwards of its first site, and reduced in height. From another contract which has been preserved, made between the Council and a master mason, the hours of labour at the close of the fifteenth century are known, minutely detailed, and stringently protected. Work was to begin at five in the morning, and cease at seven at night, with two breaks of half an hour—at 8.30 a.m. and at 4.30 p.m.—and a two hours' stoppage from 11 a.m. to 1 p.m.; in all eleven working hours per day.

About 1513 two small chapels were built south of the south aisle, but these were demolished in 1758. The last addition of all was the chapel south of the Preston aisle, erected and endowed by Walter Chepman and dedicated to St. John the Evangelist. Chepman is called "the Scottish Caxton," as the introducer to his country of the art of printing in 1507. England had anticipated Scotland in the reception of the great discovery by just thirty years. Chepman was buried in his chapel in 1532. A commemorative brass has been set up by Dr. Chambers, himself a printer and a munificent benefactor of St. Giles's. The completion of this chapel marks the culmination of the church's prosperity. In 1559 the Reformation brought about the expulsion of the Roman Catholic clergy and the rude handling

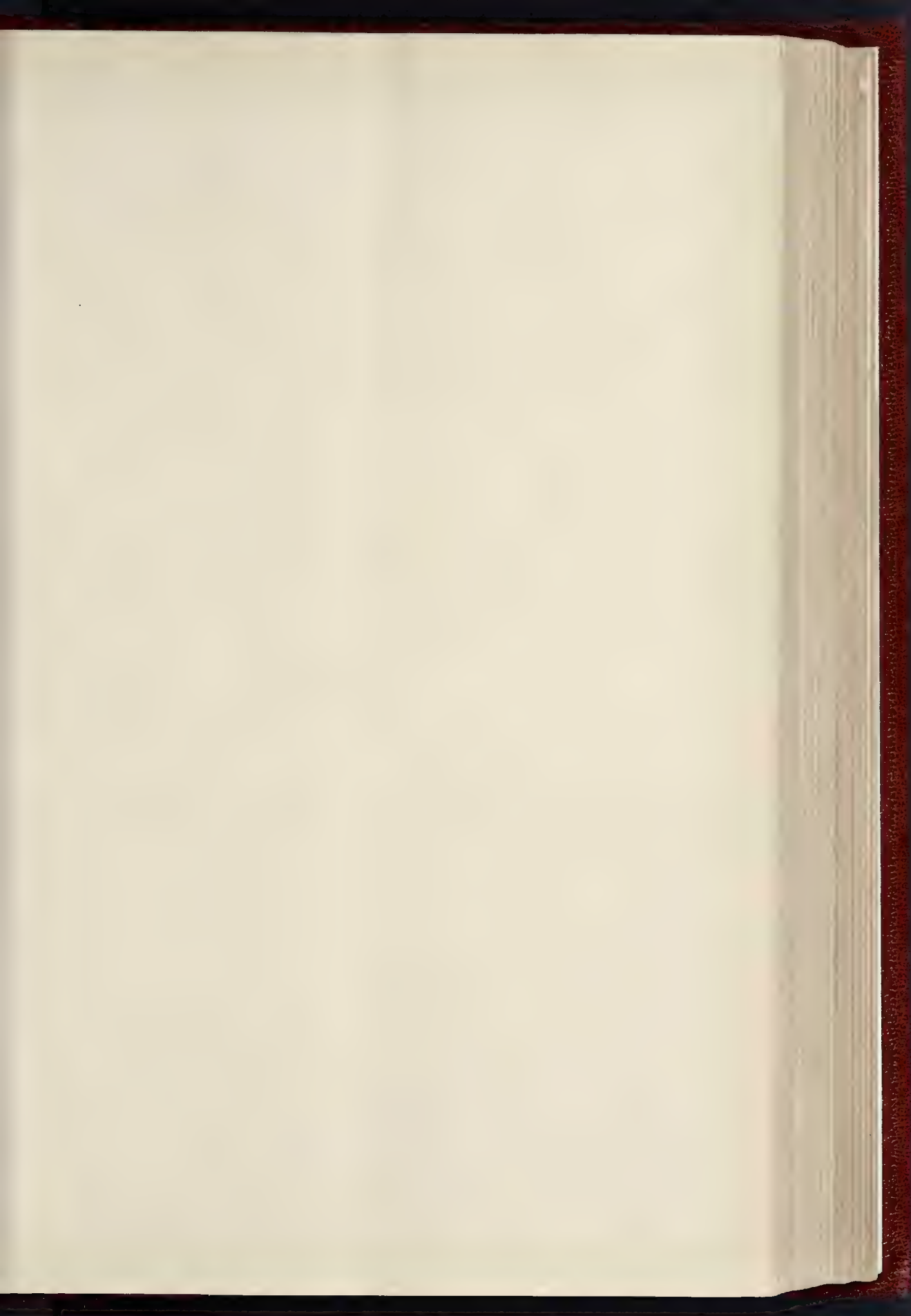
of not a few of the church's most prized treasures. An eddy in the political tide—the Court strengthened by French troops then in Scotland—permitted of St. Giles's being reconsecrated by the Bishop of Amiens, and the old order was resumed; but only for six months. In 1560 Protestantism gained the final ascendancy, and the church was completely cleared of all altars; the relics, and all valuables not lost in the dispersal, were sold. As indicating the change in popular religious sentiment, St. Giles disappears at this time from the town standard, and is replaced by a thistle. After its "purging" the church was subdivided into several, facilitating the ease of preachers and congregations; and as in this work mention is made of repairs to the west gable, it is just possible that if any western door existed, at this juncture it perished; certainly no trace of any is seen in the earliest of the illustrations. In 1571 the church ran great risk of losing its tower entirely. Sir William Kirkcaldy, Governor of the Castle, siding with the exiled Mary Queen of Scots, against the young king and the majority of his people, placed three cannon and a military force in the tower to overawe the town. When the loyal citizens attempted to destroy the piers and so bring down all, the soldiers "made the vault like a riddle to shoot through." Happily it survived the ordeal, and in quieter times a clock, taken from the Abbey of Lindore, was set up. Danger again threatened in 1600: the tower had become a town's prison, and injury was reported to the Council, the work of prisoners in their efforts to escape. For a time episcopacy regained ground, and in 1633 St. Giles's was created a cathedral by Chas. I. Thereafter a commission was empowered to visit "and make a draught of the choir of Durham, in order to beautify St. Giles's after the same manner"; but the work seems never to have gone to any length: Episcopacy languished and finally gave place to Presbyterianism at the Revolution in 1688. From that time onwards the story of St. Giles's Cathedral is one of steady degradation. In 1758 the two south-west chapels were removed for no very obvious reason, and at the opening of this present century within St. Giles's were comprised four separate churches, an Assembly hall, and a police office! In 1829, with the best of intentions, the Town Council, aided by Government grant, decreed a restoration, and some £20,000 were expended. The police office was removed, but still two churches and the assembly hall were retained. For no sufficient reason the chapels north and south, west of the transepts, were demolished; the porches north and south were demolished; the south aisle shortened by two bays, and its stone vault removed and replaced by plaster at a higher level. The nave had also its vault removed and plaster substituted—this to gain a clearstory—and the piers whittled down. All

windows throughout the church had tracery filled in, of passable design, but painfully thin. All external work was faced with large ashlar, and the cresting of the parapet that an old print shows to have existed previously was used to excess. It was for symmetry's sake that St. Eloi's Chapel was made as we have it now, balancing an apartment east of the transept. So, too, with the Caithness (Moray) aisle, forced to balance Chepman's. For symmetry, a foolish buttress is built at the west gable of the south aisle off the line of arch it should support. At the east front buttresses are built where none were before, that at the north angle, obliterating an interesting feature—Our Lady's niche. A western door was also built by Mr. Burn, the architect of this most regrettable "restoration." What the building has lost in external effect one may imagine when he thinks of the former irregularity of plan and sky-line and variety of style that must have marked the many chapels clustered round the church. The damage done is now quite irreparable. Yet improvements have been effected. In 1871 through Dr. Chambers's munificence, a better advised restoration was begun, Messrs. Hay & Henderson being the architects. The internal subdivisions were all cleared out, the nave piers restored to their former amplitude, the internal jambs of the windows refaced, and a western door built, covering up Mr. Burn's. The fourteenth-century doorway had fortunately been preserved in one of the inner partition walls and it was transferred to its present position in the royal entrance. Certain adjuncts were necessary, vestries, &c., and these, as built, distinctly add to the external effect, though suffering from compliance with conditions that could not well be regarded—the ashlar of large and perfectly regular size that prevails. Within there is some good modern glass, and not a few interesting monuments, chiefly military, in both metal and stone of the more recent being the monument to Montrose* and the wall-tablet to Lord Justice General Inglis, both by Dr. R. Rowand Anderson. In the view, given from the north-east, seen the old Mercat cross, restored to elevation from whence Royal proclamation are yet given. All interested in this church must be thankful that its interesting history has been so carefully investigated and so fully recorded as it is in Dr. Laing's "Charters of St. Giles," Dr. Chambers's Guide, and, principally in Dr. Cameron Lees's book, "St. Giles's Church, College, and Cathedral." From those the following has chiefly been gathered.

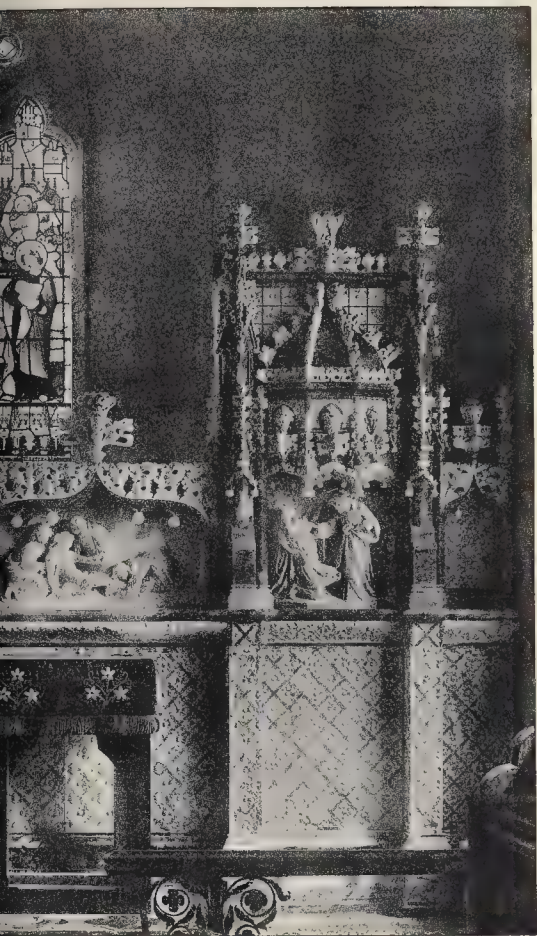
NEW CHAPEL, CHELTENHAM COLLEGE.

THE new chapel of Cheltenham College, n

* We gave a double-page view of this monument (specially engraved for us by Mr. J. D. Cooper) in *The Builder* for January 4, 1890.







INK PHOTO SPRAGUE & CO. 4 & 5 EAST HARDING STREET, PITTSBURGH, PA.

just begun, is an outcome of the jubilee of the school in 1891. As originally designed, it was to have a north transept, with strangers' gallery, but this was afterwards altered, and the present plan is a simple parallelogram, 163 ft. by 49 ft. 6 in. in extreme dimensions, and 148 ft. 5 in. by 34 ft. inside the main walls. It is in eight bays, groined throughout in stone, the span of the vault being 34 ft. and the height 55 ft., the gables being 75 ft. The seats are to be placed laterally, and the masters' stalls in recessed arches set between the buttresses. The accommodation will be for 650 boys, 50 masters, and 160 visitors. The organ is to be in a gallery over the west door.

The present contract, a little under 10,000l., is for seven bays and a temporary west wall, and includes no carving, statues, or marble paving, and few fittings. The contractor is Mr. Collins, of Tewkesbury. The architect is Mr. H. A. Prothero (Middleton, Prothero, & Phillott).

REREDOS, BRATTON CLOVELLY CHURCH, NORTH DEVON.

THE design for the reredos and figure subject was made by Messrs. Tait & Harvey, and carried out by Messrs. Luscombe, of Exeter. The entire work is in alabaster, polished upon its plain surfaces only. The reredos stands upon a pavement of green and dove marble, effective against the warm colour of the alabaster.

COMPETITIONS.

NEWINGTON PUBLIC BATHS AND WASH-HOUSES.—We are informed that the designs sent in in this competition are now on view at the Newington Vestry Hall, Walworth-road, and that No. 7, submitted by Mr. E. B. Anson, has been awarded the first premium.

BOARD SCHOOLS, SOUTH SHIELDS.—The South Shields School Board has undertaken the erection of new schools near the Tyne Dock end of Stanhope-road. In response to an advertisement for competitive plans by local architects, eleven sets of plans were sent in. These were duly examined by the arbitrator, Mr. Landless, of Leeds, and he has placed first the plans under the motto "Corridor"; second, "Utility"; and third, "Light." On opening the sealed envelopes it was found that Messrs. Davidson & Bendle were the authors of the designs placed first; and that Mr. J. W. Donald and Mr. W. Hanson were second and third respectively. The total cost of the buildings when completed will be nearly 20,000l.

THE LONDON COUNTY COUNCIL.

AN adjourned meeting of this Council was held at Spring-gardens on Friday, the 28th ult., the Chairman, Mr. John Hutton, presiding.

The Boundary-street Improvement Scheme.—The Public Health and Housing Committee presented an important report on this scheme, which affects an area of about 15 acres, part of which has been cleared. The Committee reported that—

"The Architect has submitted sketch plans for dwellings four stories in height, which provides each tenement with a separate scullery, containing sink and copper and disconnecting lobby and private w.c. entered therefrom, with through-ventilation in every room. It is estimated, however, that if the buildings are erected on this plan, the return of 3 per cent. required by the Council's resolution of the 21st of March last cannot be obtained. It therefore becomes necessary either to increase the height of the dwellings, as by this means the additional rents so obtained would compensate for the extra cost in building, or to abandon the idea of self-contained tenements, and substitute closets and sculleries used in common. After careful consideration, we are of opinion that it would not be desirable to adopt a lower standard of sanitary requirements than those already approved, and we therefore propose that one block of the buildings to be erected on the site in question shall be five stories, and the other block four stories in height, the site not lending itself to the erection of five stories throughout. We should state that in regard to the buildings proposed to be erected on plot A, Cable-street site, the Home Secretary has intimated his disapproval of five-story dwellings on that site. We do not gather, however, that his decision is final, and we trust that when the reasons which led to the erection of five stories of five stories have been put before him, he will not insist on an alteration of the plans. It is intimated that in order to insure the erection of the buildings on the Boundary-street plot four stories in height without loss to the Council, the cost of the buildings must not exceed 9,000l., whereas the estimated cost is

11,000l. In the case of the four and five-story buildings, however, 12,000l. will be available for the difference—300l.—will, it is expected, be saved in the carrying out of the work. The requirements of the Council with respect to open space in front and in rear of the buildings will be fully complied with, and accommodation for 272 persons is provided. We recommend—

"That the Council do approve of the erection of four and five-story buildings on the portion of the Boundary-street area lying to the east of Mount-street, and that the Secretary of State be asked to grant the Council permission itself to erect the dwellings."

This was agreed to, after some discussion.

The Blackwall Tunnel: Southern Approach Roads.—The Bridges Committee reported as follows:—

"We have to report that we have considered the two tenders referred to us by the Council on the 27th June, for making up the approach roads to the Blackwall Tunnel on the south side of the river, and the construction of the necessary sewers and paving works, as printed in the Council Minutes of the above date. Having given the matter our careful attention, we think, in the interest of the Council, that it is advisable to proceed with the offer made on 20th July, 1892, by Messrs. Pearson & Son, the contractors for the tunnel works, to construct about 1,500 yards of the approaches at the various prices fixed by them for doing the work, making a total sum of 8,952l. 6s. We recommend—

"That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the Council do enter into a contract with Messrs. Pearson & Son for carrying out the portions of the southern approach roads to the Blackwall Tunnel referred to in Messrs. Pearson's letter of the 20th of July, 1892, and at the schedules of prices contained therein."

Colonel Ford moved the following amendment:—

"That in the opinion of the Council the report of the Committee is extremely meagre and unsatisfactory, and that the recommendation be referred back to the Committee with instructions to report to the Council at the next meeting on the following points:—(1) Whether Messrs. Pearson & Son claim that the work included in the recommendation forms part of the Blackwall Tunnel contract, and whether they so claim as regards the rest of the work for making the southern approach roads, and, if so, the grounds of such claims, and generally what is the position which Messrs. Pearson & Son take up in regard to these approach roads; (2) whether it is necessary that the whole of the southern approach roads should be finished and ready for traffic as soon as the tunnel is completed; and (3) whether, if the Council should hereafter decide to adopt the present recommendation of the Committee, the remainder of the work of making up the roads (being the great bulk of it) would be undertaken by Messrs. Reed, Blight, & Co., the lowest tenderers, and, if so, at what price; or how otherwise the Committee proposes to secure the due execution of the work."

Mr. Campbell seconded the amendment, which after some discussion was rejected, on a show of hands, by a large majority.

The following amendment was then moved by Mr. Lloyd:—

"That the tender of Messrs. Reed, Blight, & Co., amounting to 68,854l., for making the southern approaches to the Blackwall Tunnel be accepted, and that the Solicitor be instructed to complete the contract."

This amendment met with the same fate as Colonel Ford's, and the recommendation of the Committee was agreed to.

Purchase of a Site for a new Asylum.—On the recommendation of the Asylums Committee, it was resolved to purchase 140 acres of the Baldwin's Park estate, Wilmington, Kent, at the price of 175l. per acre, as a site for a sixth County Asylum, to accommodate 1,000 or more patients.

The Bozier's-court Improvement.—Once more the Council had before it a recommendation from the Improvements Committee that the Council should apply to Parliament for powers to widen the southern end of Tottenham Court-road at Bozier's-court, but once more it was decided to postpone the improvement pending an alteration in the incidence of taxation.

After transacting other business the Council adjourned at seven o'clock.

The last meeting of the Council prior to the holiday recess was held on Tuesday afternoon last, Mr. Hutton again presiding.

Finance: The Half-Year's Rate.—Mr. Evan Spicer, in moving the adoption of the report of the Finance Committee, mentioned that after due consideration the Committee were of opinion that it would not be necessary to make any alteration in the rate for the ensuing six months, and the rate would therefore remain at 6½d. in the pound for parishes outside the City.

Proposed Purchase of Tramways.—The Highways Committee presented a report proposing the purchase and lease of the whole of the North Metropolitan Tramways Company's undertaking in the County of London, but after a long discussion the report was referred back to the Committee for further consideration.

The Operations of the Works Committee.—On the recommendation of the Works Committee it was decided to purchase the freehold of the wharf now occupied by them at Belvedere-road, Lambeth, for a sum not exceeding 39,000l. The wharf is stated to have an area of about 66,000 square ft., with a frontage to the Thames of about 205 ft., a frontage to Belvedere-road of 220 ft., and an average depth of 370 ft. The Council also authorised the expenditure of 4,500l. for timber and other materials for works in hand, and 4,000l. for plant.

Office Accommodation for the Council.—On the recommendation of the Establishment Committee, it was resolved to acquire, for the sum of 12,000l., No. 6, Spring-gardens, and to take No. 8, Spring-gardens on lease at a rental of 300l. per annum. It was remarked that to build proper accommodation for the whole of the Council's office staff would be much more economical than to have several of its departments scattered about in different buildings.

After transacting a great deal of other business, the Council adjourned at nine o'clock (after sitting for six hours) until Tuesday, October 3.

Correspondence.

To the Editor of THE BUILDER.

HOLBORN TO THE STRAND.

SIR,—The publication of Mr. Shoppee's plan in the *Builder* for July 8 (p. 28), again brings this matter to the front.

It seems to me that Mr. Shoppee's plan shows one of the least practicable schemes that has yet been brought forward. Commencing with the northern end, it will, I think, be generally conceded that it is unnecessary to lay down a new street on entirely different lines, causing a break in the continuity of the very good thoroughfare now extending northwards through Russell-square, when that continuity might be maintained and less expense incurred by widening Southampton-row at its southern end.

Then again, Lincoln's Inn Fields do not afford the best line for a new street, and the proposal to retain the old houses on the western side would not improve the appearance of a brand-new thoroughfare, especially as that particular side, although archaeologically interesting, is the oldest and most dilapidated in the square, and the houses would be altogether out of place amongst the new palatial buildings likely to be erected on such a thoroughfare.

Coming to the spur-streets south of the southern circus, they, and in fact the whole of that portion of the scheme, appear to be laid down on most extravagant lines, without any corresponding advantages. The eastern spur running down to the Church of St. Clement Danes is so close to the main street, that no considerable depth would be available for building in either street for the first hundred or hundred-and-fifty yards, leaving awkward pieces, difficult to deal with, which has been too much the case in recent street improvements.

The street leading, as the description says, "directly to the Church of St. Mary-le-Strand," appears to be designed for no other purpose, and whatever architectural interest the church may have, the construction of a new street for the sole purpose of setting it off is unwarranted, and we should be content if sufficient interest is brought to bear to save it from destruction in future street improvements. And further, it is questionable whether a street approaching the church from the north, affording a view from much higher ground, would enable the church to be seen to the best advantage.

The main street, Mr. Shoppee explains, is intended to pass under the Strand and on the site of Surrey-street, terminating on the present approach to the Victoria Embankment.

With regard to the passage of the street under the Strand, I have not any sections before me at the time of writing, but from an intimate knowledge of the district I feel sure that no workable gradient would be obtainable with such a scheme, and certainly if communication with adjacent streets is suggested, which would be necessary if the thoroughfare is to be of practical value, it would be quite impossible without upsetting the levels over a very large area between Holborn and the Strand in an altogether impracticable manner.

It is to be regretted that Mr. Shoppee has not given sections with his plan, or, at any rate, some details as to levels and gradients so as to show fully what his proposals are.

The outlet to the Embankment cannot be looked upon as good, and owing to the existence of the Temple Station and the tunnel of the District Railway no improvement in the scheme could be made at that point, which is a weak one, and if the scheme were carried out would always be a source of much inconvenience.

The first great object to be obtained in designing a new street in this portion of the metropolis is to

needle-like prisms radiating from a centre, or in a massive form; cleavage, difficult; colour, mostly black (schorl), but sometimes red, green, or blue; lustre, vitreous; brittle; hardness, 7.0-7.5; specific gravity, 2.9-3.3; containing silicate of alumina, with from 4 to 10 per cent. of boric acid, also magnesia and smaller proportions of phosphoric acid, ferrous oxide, manganese, lime, potash, soda, lithia, fluorine, and water—a remarkably varied and complex composition. It occurs in such rocks as granites and crystalline limestones.

Hornblende crystallises in the monoclinic system; cleavage, perfect; colour, dark green, black, or light brown; hardness, 5.0-6.0; specific gravity, 2.9-3.4. Hornblende may be divided into two groups, according to whether it contains alumina or not. The non-aluminous kinds consist chiefly of meta-silicates of magnesium and calcium, and minor proportions of the protoxides of iron and manganese. The aluminous varieties have silica, alumina, magnesia, lime, and ferrous and ferric oxides. Hornblende is commonly found in metamorphic and igneous rocks.

Augite crystallises in the monoclinic system, is often minute, in stout prisms, or in irregular patches; colour, green, black, or dull white; lustre, vitreous, fibrous, or granular; hardness, 5.0-6.0; specific gravity, 3.2-3.5; chemical composition, silicate of lime, magnesia, alumina, iron, and manganese. Like hornblende it has been divided into two groups depending on the presence or absence of alumina. It is commonly met with in volcanic rocks.

Iron very rarely occurs in the native state except as grains, and pieces which have come to the earth as meteorites. It is mostly found as iron oxide or sulphide, in which conditions it is present abundantly in many rocks. We cannot advise the student too strongly to become thoroughly familiar with the different kinds we are about to describe. The presence or absence of one or other variety in certain materials of construction, will oftentimes determine the suitability of the material for the work in hand. No class of minerals, as a whole, produce such baneful effects on weathering, from an architectural point of view, as do the divers iron oxides, and sulphides. The unsightly brown stains and lines which become apparent on the surface of many building stones a few years after they have been put up; the mottled and patchwork effect; the cracking and splitting asunder of cornices and mouldings; the variation in tint of some red building stones; large holes in roofing slates, and many other things, which the builder usually accounts for by saying that they are part of the nature of the material, are largely (in most cases solely) due to the weathering of one or other of the compounds of iron. The colouring of clays, sands, &c., is mostly derived from some form of iron also. The minerals of the group, however, do not all weather in a similar manner, or at the same rate, some being much more durable than others, and it behoves the student to patiently examine each, in order to determine its relative value. Closely connected with this is the oxidation of iron in its manufactured forms, a subject to which we shall hereafter refer. We now invite attention to the iron oxides, limonite, hematite, titanite iron, and magnetite; and to the iron sulphides, pyrites and marcasite.

Limonite has no definite crystalline form, but generally occurs mammillated or stalactitic, fibrous, or as a thin film encrusting other mineral matter; colour, dark brown or yellow; sub-metallic or earthy; hardness, 5.0-5.5; specific gravity, 3.6-4.0; chemical composition, hydrous ferric oxide. It is the bog-iron ore of authors, and is a very common decomposition product in rocks containing iron. The yellow coating or film covering flints in gravel is generally limonite.

Hematite crystallises in the hexagonal system, occurring as little crystallised granules, but commonly also in massive fibrous forms, or aggregations; cleavage, nearly always indistinct; colour, chiefly deep red, grey, or iron-black; lustre, when crystallised, highly splendent; hardness, 5.5-6.5; specific gravity, 4.5-5.3; chemical composition, peroxide or sesquioxide of iron. It is found lining cavities and fissures of rocks, is an abundant component of mineral veins, and is present in many types of stone. It is known also as specular iron, or kidney ore. Compared with limonite, it is much more brilliant in lustre.

Titanite iron crystallises in the hexagonal system, occurs in thin tabular pieces, or granular; colour, brown; lustre, semi-metallic; hardness, 5.0-6.0; specific gravity, 4.5-5.2; chemical

composition, a mixture of the oxides of iron and titanium. It is found in many crystalline rocks, and does not yield so readily to the action of the weather as do the other iron oxides described.

Magnetite, as might be gathered from its name, has strong magnetic properties; crystallises in the cubic system; occurs as octahedral forms, minute irregular grains, or in a massive condition; colour, intense black, opaque; lustre, metallic; hardness, 5.5-6.5; specific gravity, 4.9-5.2; chemical composition, a mixture of ferrous and ferric oxides, often with titanite acid or magnesia. It is an essential mineral of certain lavas and intermediate rocks, entering largely into the composition of some of the decomposed ornamental stones which disfigure our streets. Its steel-like lustre on the surface of polished stones, when fresh, and its granular appearance, are very characteristic. Known also as magnetic iron ore.

Iron Pyrites crystallises in the cubic system, the faces of the cubes being frequently striated, it is also found as spherules with internal radiating structure, and as irregular streaks and patches filling up small cracks and cavities in rocks; colour, pale yellow; lustre, like brass, opaque; hardness, 6.0-6.5; specific gravity, 4.8-5.1; chemical composition, iron disulphide. When struck with a hammer it gives off an offensive odour. This, one of the commonest minerals in the universe, is found disseminated more or less throughout all rocks. When pure, which is rarely the case, it resists decomposition for ages, as witness the cubical iron pyrites so often met with in roofing slate, but when mixed or intimately associated with the mineral next to be alluded to, it is unstable. It may be readily recognised from the other minerals described, from its brassy, or gold-like lustre, but must not be confounded with copper pyrites which it in some respects resembles. The latter, sulphide of copper and iron, crystallises in the tetragonal system, and is not so hard (3.5-4.0) as iron pyrites. Although the colour of the former also is brass yellow, it is generally deeper in tone than the latter, and is often iridescent. Moreover, whilst iron pyrites emits sparks very freely when struck with steel, copper pyrites does not do so. Iron pyrites is known also as mundic.

Marcasite crystallises in the rhombic system; it has the same chemical composition, hardness, and specific gravity as iron pyrites, but is of a paler yellow colour. It occurs abundantly in aqueous rocks as minute specks, and from its tendency to weather rapidly, is an element of extreme importance in judging of the durability and future uniform appearance of many different stones. On exposure for a short time to the air it assumes a brown tint, whilst free sulphuric acid is given off, which attacks surrounding mineral matter, and the stone generally commences to break up. This may partially account for the decay of building stones situated far away from cities; in the centres of industry alone does free sulphuric acid exist in any quantity in the air. Being found, as marcasite frequently is, side by side with pyrites, the presence of either of them is not desirable in materials of construction, and the student will understand the force of this observation when it is stated that except under the microscope, in reflected light, it is extremely difficult to distinguish one from the other. The mineral may occur in such exceedingly minute specks that the test of hardness can only be applied with great caution, or not at all.

GENERAL BUILDING NEWS.

NEW BUILDINGS, ASPATRIA AGRICULTURAL COLLEGE, CUMBERLAND.—The Aspatria Agricultural College, Cumberland, which has been rebuilt and enlarged, was opened on the 21st ult. by the Mayor of Carlisle. The new building is a large quadrangular erection which faces the south. There is a central tower and two side wings, and the entrance hall extends the whole width and length of the tower. On the north side of the building a corridor runs east and west, giving access to the two wings. In the western wing there are two large class-rooms and a reading-room, the master's rooms, chemical laboratory, bath-rooms, lavatory, &c. The first floor of the wing is taken up with the private rooms of the elder students, while above these are dormitories. In the east wing are located the reception rooms, the library, the dining-hall, which is capable of giving accommodation to from eighty to ninety students, the housekeeper's rooms, and the domestic offices. On the first floor are the private apartments of the principal, a billiard-room, and the bedrooms of the servants, and on a triangular piece of land across the road in front of the college are to be found a forestry and a botanical museum and garden, while the large agricultural museum belonging to the college is situated some few hundred yards away.

The architect of the building was Mr. Scott, of Carlisle, and the work has been carried out by Mr. L. Ferguson, builder and plumber, Workington; Mr. W. Latimer, joiner, Carlisle; Mr. J. Walker, slater, Cockermouth; Mr. Gordon, painter, Maryport; Messrs. S. Ferguson & Son, plasterers, Carlisle; Messrs. Musgrave & Co., Belfast, heating apparatus; Mr. E. H. Shawland, hot-air grates; and Messrs. J. Stuart & Co., Lancaster, stained glass.

NEW ROMAN CATHOLIC CHURCH AND SCHOOLS, BOW COMMON, E.—The ceremony of laying the foundation-stone of these buildings was performed on the 26th ult. by the Cardinal Archbishop of Westminster. Both the church and schools have been designed by Mr. Fredk. A. Walters, of Great Queen-street, Westminster. The church will be in the thirteenth-century style of architecture, and will accommodate about 800 persons, and the schools are arranged for 500 children. Messrs. Gregory & Co., of Clapham Junction, are the contractors.

EXTENSIONS TO HOLY TRINITY CHURCH, GATESHEAD.—On the 27th ult. the foundation stone of the extensions to Holy Trinity Church, Gateshead, was laid by Mrs. Westcott. The scheme embraces the removal of the north wall and the construction of a nave and north aisle. The nave will be 72 ft. long, including chancel, and 22 ft. wide; the aisle 72 ft. long, including organ chamber, and 9 ft. 6 in. wide. The old church will remain as a south aisle, and the chancellor of the diocese has sanctioned its use as a side chapel, so that the present altar will not be removed, while the high altar will be at the east end of the new nave. A porch with vestries will be erected at the north-west portion of the building, and the new west gable will be set slightly back from the existing front in order to leave the latter intact. The new work is in harmony with the old, and has been designed by Mr. Stephen Piper, architect, Newcastle, and is being carried out by Messrs. Anderson & Slater, contractors, Newcastle, under the personal supervision of the architect. Mr. Richley is clerk of the work. The total cost of the alterations and additions, including the removal of the Ellison School, will be 4,900l.

CHURCH, SHALDON, DEVONSHIRE.—On the 21st ult. the Bishop of Exeter laid the foundation-stone of the new church which is to be erected at Shaldon. The building, which will be erected from plans prepared by Mr. Sedding, architect, of Plymouth, will accommodate 450 persons. The structure will be 100 ft. in length. The aisle walls will be erected completely of a dark red sandstone, with windows of Polyphant stone, the other dressings being of limestone.

ST. ANDREW'S CHURCH, AVONMOUTH, NEAR BRISTOL.—The new Church of St. Andrew, Avonmouth, was consecrated on the 27th ult. by the Bishop of the Diocese. The structure, consisting of chancel and south aisle, was erected westward to a temporary wall, leaving the west front to be added, together with other portions. Mr. Wood-Bethell, architect, furnished the design in accordance with which Messrs. R. Wilkins & Sons, of Bristol, have constructed the edifice, Mr. G. Downs being clerk of the works. A feature of the interior is the carving in the chancel, executed by Mr. William Smith, of Bristol. The iron-work, specially designed by the architect, is by Mr. J. A. Hunt, of Hoddessdon.

PROPOSED FAMILY HOME, GLASGOW.—The City Improvement Trust, Glasgow, decided on the 20th ult. to erect a Family Home on ground belonging to them in St. Andrew's-street. Plans for the building have been prepared by Mr. Macdonald, the City Engineer, and have provisionally received the sanction of the Council. The area of ground set apart for the home is situated on the north side of the street, between the Saltmarket and London-lane. It measures in all about 2,000 square yards. The building will be four stories in height, and may be described as T-shaped. It will contain 176 dormitories, each sufficient to accommodate two adults and one child, and there will be the usual provision for cooking, dining, and recreation purposes. There will also be a crèche, in which children residing in the home will be cared for in the absence of their parents. The dining-hall, kitchen, washing-house, stores, &c., are on the ground floor. The three upper floors are occupied by dormitories arranged upon either side of central corridors with through draught. There will be a recreation-room on the upper floor, and independent lavatory accommodation on each floor. The dormitories will each measure 12 ft. by 8 ft., and will have a cubic space of 1,000 ft.

NEW THEATRE, SHEFFIELD.—On the 28th ult. Sir Augustus Harris laid the foundation-stone of the City Theatre, Sheffield. The building will be capable of accommodating 2,500 people, and will possess pit, circle, and gallery, each section provided with coffee and smoke rooms. The circle holds 550 people, the pit 950, and the gallery 1,000, there being sitting accommodation for about two-thirds of these numbers. A fireproof curtain divides the proscenium from the auditorium, and extra exits and emergency doors for both audience, players, and stage men are provided. The designs are by Mr. Walter Emden, of London, and with him Mr. Edward Holmes, of Sheffield, has been associated as the local architect. Messrs. Starr & Cartwright are the quantity surveyors. Mr. Webster, Sheffield, is the contractor.

BATHS AND WASHHOUSES, ISLINGTON.—The Islington Vestry at their meeting on the 21st ult. sanctioned the scheme of the Commissioners for Baths and Wash-houses for their new and largest set of baths and wash-houses, viz., that for the St. Peter's district. The plans have been prepared by Mr. A. Hassell Tiltman, their architect, for the two sets of establishments which were won by him in competition and which are now completed. Mr. Tiltman, we understand, was appointed architect in this case without competition some two months ago, and it is now intended to proceed with the work with all possible expedition.

LAVATORY ASYLUM AT LARBERT, STIRLING, N.B.—The new hospital for the treatment of acute lunacy, which has been erected by the Stirling District Asylum Board at Larbert, was opened on the 26th ult. According to the *Scotsman*, the building has been designed in the Elizabethan style, and the principal elevation of the hospital is towards the south. In length the building is close upon 300 ft., and the greatest breadth is 126 ft. The main features of the design are a central block and two side wings, with connecting corridors, for male and female patients. Each wing in turn is sub-divided into two other divisions—one for acute cases of insanity and one for feeble and sick cases. The main entrance to the hospital faces the north. In front of the entrance hall is the administrative department, containing medical office, surgeons' matron's room, and waiting-rooms for visitors and patients, while on either side are the male and female wings. The kitchen, scullery, offices, and nurses' rooms also find a place in the administrative block, and the dining hall is situated exactly in the centre of the building. The kitchen and dining hall are connected. All the cooking is done by steam and gas, no coal being used. The dining-hall affords sitting accommodation for about 100 inmates. The principal dormitories and day-rooms face towards the south. With regard to the system of heating and ventilation, steam is conveyed by means of pipes from the boiler-rooms to a separate building about 100 yards distant—and distributed through a series of small pipes over the building. By means of gratings in the walls fresh air is admitted to the apartments after being heated by coming in contact with these pipes. In summer the gratings form an additional means of ventilation. The foul air in the rooms is carried off to the roof by means of a shaft. The dormitories and sleeping-rooms of the patients are provided with bath-rooms and lavatories in close proximity. In the dormitories special rooms are set apart for patients becoming dangerous during the night, and there are extra rooms for infirm patients. The walls and floors of the padded rooms are lined with indianubber, padded with cocoa-nut fibre. Corridors for the use of the patients are provided at each end of the building, which open upon verandahs. In the event of infectious disease breaking out in the asylum, the wings may be isolated. Altogether accommodation is provided in the building for 120 patients, and the cost of the erection of the building has been about 20,000l. The work has been carried out under the superintendence of the architect, Mr. William Black, C.E., Falkirk, and Dr. Macpherson, medical superintendent. A number of additional alterations have been carried out on the main building, and a special administrative block has also been improved, the total cost of the whole of the improvements, including the hospital, amounting to about 40,000l.

BOARD SCHOOLS, LONG EATON, DERBYSHIRE.—New schools have just been erected by the Long Eaton School Board, Derbyshire. The schools are built of red pressed bricks, with Darley Dale stone facings. They comprise fourteen class-rooms, five for the accommodation of 233 boys, five for 233 girls, and four for 240 infants. There are three cloak-rooms with lavatories, a cookery with two ovens and a gas-stove, and there are two private rooms for the head teachers. Each department is reached by separate corridors, at the termination of which is the central hall, 126 ft. long and 26 ft. wide by 26 ft. high. There are two revolving screens, forming a central hall, 42 ft. by 26 ft., for each department. The contract is 7,368l., exclusive of the site. Mr. John Sheldon is the architect, and Messrs. Perks & Son are the contractors.

WESLEYAN SCHOOL, LEEDS.—The foundation-stones of the "Charlie Coulson" Wesleyan Memorial School, Roseville-road, Leeds, were laid on the 29th ult. The new buildings will comprise a schoolroom, or mission-hall, capable of seating 400 persons, 63 ft. long and 34 ft. wide, with a special timber roof 27 ft. high in the centre. There will be a recessed platform at one end. The room will be lighted on one side by three-light windows. There will be separate entrances for boys and girls. Round three sides of this room separate class-rooms are arranged, including an infants'-room, with raised gallery. Upstairs a ladies' sewing room is placed. Kitchen warming apparatus and other accessories are placed in the basement. The whole of the buildings will be heated by hot water. The interior woodwork is pitch-pine, and the buildings are being erected of brick, with stone dressings, in the Gothic style, from the designs and under the superintendence of Mr. G. F. Danby, architect, of Leeds, at a cost of 3,000l.

ENLARGEMENT OF ST. PAUL'S CHURCH, PENZANCE.—On the 28th ult. was laid the corner stone of an enlargement to St. Paul's Church, Penzance. The proposed enlargement consists of the erection of a new north aisle, and the consequent extension of the transept. The north wall will be carried about 25 ft. distant, thus providing additional accommodation for about 150. There will be two new entrances in Clarence-street, and also a back entrance. The font will be removed, the choir stalls lengthened, and the lectern removed so as to open up the chancel. The total cost is expected to be about 1,500l. The plans have been prepared by Mr. J. W. Trounson, F.R.I.B.A., of Penzance, and the contract has been taken by Mr. W. H. Stephens, of Penzance. The existing church is in the Early English style, and the new portion is to be in harmony with it, the work to be done in Castle-au-Dina stone with granite dressings.

NAVE, ST. MICHAEL'S CHURCH, BRIGHTON.—On the 26th ult. the foundation stone of a new nave for the church of St. Michael and All Angels, Brighton, was laid by Lady Troubridge. Though complete in itself, the present church, which has been in existence about thirty years, and which has frontages to St. Michael's-place and Victoria-road, will become the south aisle of the extended church. The nave will be of the same length as the existing church, namely, 112 ft., and will extend from west to east, with an entrance from St. Michael's-place. The width will be 30 ft., and beyond, on the north, will be another aisle, 23 ft. wide. The existing church is 62 ft. high, but it is intended that the nave shall rise 36 ft. above it to a height of close upon 100 ft. Externally the nave and new aisle will correspond in general appearance with the present church, which is of red brick, with Bath stone dressings. The church is being built by Messrs. Eastcourt & Sons, of Gloucester, from the designs of Messrs. Chappell & Co.

NEW CHURCH, COGAN, NEAR PENARTH.—On the 27th ult., Lord and Lady Windsor laid the memorial stone of the Church of Holy Nativity, Cogan. The new building is in the Perpendicular style, and will accommodate over 300 worshippers. It will consist of nave, transepts, chancel, south porch, heating-chamber, vestries, and organ chamber. The material used is local limestone, lined with Catybrook brick in bands. The total cost of the church will be about 2,500l., including the boundary walls. The architect is Mr. C. B. Fowler (Messrs. Kempson & Fowler, Cardiff), and the builder Mr. W. Richards, of Barry.

STAINED GLASS AND DECORATION.

WINDOW, TRURO CATHEDRAL.—An addition has just been made to the series of stained glass windows in Truro Cathedral. One of the two lancet lights in the east wall of the north transept has been fitted with a memorial to the late Mr. Pole Carew, of Antony. The subject, which falls into the historical and ecclesiastical series planned for the whole building, includes in the light itself three illustrious saints of Cornwall. In the centre is St. Piran, the early evangelist of West Cornwall; on either side, slightly below him, are St. Germanus (in Episcopal vestments) and St. Petroc. The work has been carried out by Messrs. Clayton & Bell, of London.

MEMORIAL WINDOW, CHRIST'S CHURCH, MORNINGSIDESIDE, EDINBURGH.—On the 30th ult., at Christ's Church, Morningside, Edinburgh, two stained-glass windows and a mural brass erected as a memorial of the late Rev. F. E. Belcombe were unveiled. The windows are situated in the south-west end of the nave, with the mural brass between them, and have been executed by Messrs. A. Ballantine & Gardner, of Edinburgh.

FOREIGN AND COLONIAL.

FRANCE.—The sculptor Maillat has completed the important work, entrusted to him by the Direction des Beaux-Arts, of restoring the statues which decorate the park at Versailles. —M. Antony Valabreque has been directed, by the Ministry of Public Instruction and Fine Arts, to go and study the museums of the North and East of France, as well as those of Belgium and Germany. —The Minister of Public Works will shortly put in hand the works necessary for the prolongation of the submersible dam on the right bank of the Canche (Pas-de-Calais). —At Toucy (Yonne) there will shortly be inaugurated a monument to the memory of Pierre Larousse, the well-known encyclopedist. —A committee has been formed at Belin (Ain) for erecting a statue to Lamartine, in front of the college where he was a student. —Excavations recently made in Alsace-Lorraine have brought to light a Roman house, 40 metres in length and about 8 metres broad. On the site there have also been found rings, urns, pottery, and bones. The work of exploration is being actively prosecuted. —A subscription has been opened to raise funds for erecting in the little town of Remiremont (Vosges) a monument to the young soldiers of that arrondissement who fell during the War. —On Sunday last the statue of Joan of Arc (Anjou) was inaugurated; it is the work of the sculptor Croisy. —M. Cottereau, architect, has been instructed by the French Government to prepare a plan for a monument to be erected at an early date at Kustendy, on the Black Sea, to the memory of those French soldiers who, dying during the Crimean War, were interred in the cemetery of that town. The town of Grenoble has organised a national exhibition of watch and clock-making; it comprises a very interesting section devoted to retrospective art. —A distinguished archaeologist, M. Boucher de Molandon, has just died at Orleans, aged eighty-seven. He was the owner of the Château de Reully, where Joan of Arc slept, and whence she set out to raise the siege of Orleans. He especially occupied himself with the history of Joan of Arc, and his works, which are of the highest interest, brought him the cross of the Legion of Honour. —The death is also announced of M. Eugene Michel Guy, architect, of Gentilly (Seine), at the comparatively early age of forty-nine. —On Saturday next, August 7th, there will be opened at Havre, in the garden of the Orangery adjoining the Hôtel de Ville, an International Exhibition of Hygiene, which will remain open for a month. —The exhibition of designs sent in in competition for the Prix de Rome (architecture) has been opened at the École des Beaux-Arts, in Paris. The subject prescribed for the competitors was "a palace for the learned societies." —M. Leon Masson, engineer to the Conservatoire des Arts et Métiers, who is well known by his important works on the resistance of materials, has received the order of the Legion of Honour. —A monument erected in the cathedral of St. Briac, to the memory of St. Guillaume, has just been inaugurated.

BERLIN.—It has now apparently been decided that the old Prussian Royal Academy building is to make room for a new one. The present building has stood since 1745, having been erected by the architect Boumann after the destruction of an earlier building by fire in July, 1743. Its site is on the "Unter den Linden." The smaller section of the Divisional Chief for the various sections of the Royal Technical College has taken place. Professor Dobbert will have charge of the architectural division. —The whole of the sculpture in the Royal museums has been re-arranged. The improvements are greatly appreciated both by savants and artists, as care has been taken to place the exhibits chronologically and at the same time very artistically. —Elberfeld is to have a new Town Hall, and a competition for the design has been opened. 1,250l. will be given in prizes, 500l. being the value of the first premium. There will be seven assessors, among whom we notice Professor Ende, of Berlin, and Professor Thiersch, of Munich. —According to the *National Zeitung*, two tumuli have recently been opened at Bornhöved, in Schleswig. In both cases stonework was here discovered under the outer earth. The smaller tumulus is rectangular in form, and contained bones, with various articles of personal adornment, from the nature of which it is concluded that it was a grave of the Bronze Age. The larger tumulus is square, and contained four separate graves. In this case bones, in wooden sarcophagi, were found, together with bronze vessels, and bracelets fashioned in gold. In one of the graves the bones were covered with a woollen vestment, worked with gold thread.

DRESDEN.—During some repairs on the "Frauenkirche" a number of pieces of sculpture and wood-carcass have been found. They apparently belonged to the monuments in the old Frauenkirche which was burnt down in 1727. Some of the finest alabaster sculpture found is dated between 1556 and 1652. —The new dam at Einsiedel in Saxony is now approaching completion. A reservoir is being formed to supply the town of Chemnitz, which is about seven miles distant, with water by the submerging of three valleys. The superficial area of the reservoir will be about ten acres, and its maximum contents 72,000,000 gallons. No less than 770,000 cubic ft. of masonry have been employed in the construction of the dam, which is nearly 200 yds. long and 60 ft. high. At the foundations, which are 30 ft. below ground level, the thickness of the masonry is 70 ft.; at the crown it measures 12 ft.

SWITZERLAND.—Lucerne is to have a new central railway station. An "international" competition has been opened for the design. The sending-in date is November 15. Particulars are obtainable, free of charge, from the Chief Engineer to the "Zentralbahn," No. 36, Leonhardsgraben, 1, Basel. —According to the *N. Zürcher Zeitung*, another lake dwelling has been recently discovered by Dr. J. Früh on the western shore of the Greifensee (about ten miles east of Zurich). The remains of eight huts have been found, occupying in all a space of 105 by 12 metres. The piles are mostly of oak, and of small diameter. The dwellings are considered to date from the end of the Stone Age.

BRUSSELS.—A competition has been recently held for the design for an artistic poster for the Belgian Ostend-Dover passenger boats. Eighty designs were sent in by sixty-three candidates, the first premium (400l.) falling to M. Henri Cassiers.

MISCELLANEOUS.

THE WORTHING WATER-SUPPLY.—The inquiry into the question of a new water-supply for Worthing, which the Local Government Board has specially expedited in view of the recent outbreak of typhoid, was held by Mr. Arnold Taylor, in the Council Chamber, Worthing, on the 1st inst. The nominal loan asked for was 3,000l., one-third representing the cost of the proposed site, and the remaining two-thirds to be repaid by the Corporation to make an immediate start with the works. The complete outlay will extend to many thousands of pounds, but it is at present impossible to prepare an accurate estimate. Mr. Corrie Grant appeared for the Corporation, and stated that though the cause of the outbreak was not yet absolutely determined, the Council had decided to deal most rigidly with the public water-supply and make it perfectly free from suspicion. Evidence was given by Dr. Kelly, Medical Officer of Health (who recommended that the existing works should be closed and an entirely new supply of water obtained), and by Mr. Mansergh, civil engineer, and Mr. Lucas, the well-known geologist, both of whom affirmed the desirability of the site selected at the foot of the Downs. Mr. Gainsford, an extensive owner of land in the neighbourhood, objected to the site, on the ground that he has twenty-three wells in the line of the proposed works, and that his supply is likely to be interrupted thereby. A meeting of the Town Council was held on the same day, at which it was resolved to purchase the works of the West Worthing Water Company, which embraces the West Ward of Worthing in its area of supply.

THE SWEDISH TAR TRADE.—A Swedish contemporary draws attention to the circumstance that barrels of Swedish tar are becoming more and more underweighted. This is a serious matter to builders and importers. Formerly the whole barrel had contained forty-eight Swedish kannas of tar, and the half barrels twenty-four kannas, before they were branded with the Government brand (crown) as being full weight; but since the introduction of the metric system branding by the Government has been abolished, and consequently the size and contents of the barrels, which are sold at so much a piece, are steadily decreasing. In addition on the other hand, every barrel of tar has to be branded with its contents before sale is allowed.

BELLS, WORTLEY CHURCH, NEAR SHEFFIELD.—A new set of bells having been presented to the above Church by the Marchioness of Drogheda, advantage has been taken of the opportunity to provide a new clock with Cambridge chimes. The clock shows the time upon two large external dials, which are painted with a white ground, the hands, figures and minutes being painted black. The clock is fixed on strong iron brackets, is provided with Lion Gimbals, and the time is regulated by escapement and compensation pendulum, and strikes the hours and Cambridge chimes upon the new bells. The whole of the clock-work has been made and fixed by Messrs. Wm. Potts & Sons, of Guildford-st., Leeds.

PUBLIC IMPROVEMENTS, CARLISLE.—On the 18th ult. Major-General H. D. Crozier, R.E., Local Government Board Inspector, held an inquiry in the Committee Room of the Town Hall, Carlisle, with respect to the application of the Town Council for sanction to borrow 16,000l. for the purpose of opening out and improving Lowther-street. The Town Clerk, Mr. Collingwood, explained how the amount which the Corporation wished to borrow was made up. The City Surveyor, Mr. W. Howard Smith, stated that of the 13,595 yards which had been purchased the actual street would take 4,200 square yards. The property between the proposed new street and Rickergrate, he explained, was some of the oldest in the city, and it was hoped that the owners of it would acquiesce the surplus with a view of improving the neighbourhood. The Inspector afterwards held an inquiry with reference to an application for sanction to borrow 8,000l. for gas works purposes. This concluded the inquiry, and the Inspector afterwards visited the gasworks and inspected the Lowther-street property.

CREDENCE TABLE, ST. MICHAEL'S CHURCH, CADBURY, DEVONSHIRE.—In the sanctuary of St. Michael's Church, Cadbury, there has just been placed a marble credence table. It is fixed on the north side, close to the marble reredos, to which additions were made some few years ago from designs prepared by Mr. R. Medley Fulford, F.R.I.B.A., architect, Exeter. The credence table itself is of warm-coloured and polished Devonshire marble, and is supported on the wings and shoulders of an angel, sculptured in white Castellani marble. The figure is represented with hands in the attitude of prayer, and with extended wings. The credence, like the reredos, is the work of Messrs. Harry Hems & Sons, of Exeter.

PROPOSED PUBLIC IMPROVEMENTS IN WOLVERHAMPTON.—The Town Council of the Borough of Wolverhampton having applied to the Local Government Board for sanction to borrow 45,918l. for purposes of sewerage and sewage disposal, 14,000l. for works of paving, and 1,927l. for purposes of electric lighting, Mr. Samuel Joseph

Smith, Local Government Board Inspector, attended at the Council Chamber of the Town Hall on the 25th ult., to inquire into the subject-matter of the applications. At the close of the inquiry the Inspector visited some of the places where the improvements are to be made.

MEETINGS.

FRIDAY, AUGUST 4.
British Archaeological Association.—Annual Congress, Winchester (continued).

SATURDAY, AUGUST 5.
British Archaeological Association.—Annual Congress, Winchester (continued).

MONDAY, AUGUST 7.
Liverpool Engineering Society.—Excursion to the Dore and Chinley Railway (Midland Railway, Derbyshire), by permission of the engineers, Messrs. J. Somes Story and E. Parry.

FRIDAY, AUGUST 11.
Junior Engineering Society.—Summer Excursion (Wills, Devon, and Cornwall).

SATURDAY, AUGUST 12.
Glasgow Architectural Association.—Visit to Dunblane Cathedral, Doune Castle, Stirling, &c.
Junior Engineering Society.—Summer Excursion (continued).

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

13,244. **FLUSHING DRAINS:** E. Turner. This invention relates to self-flushing house or sewer drains, in which the base or container of same is made of cast-iron, earthenware, or other material, and the outlet or discharge-pipe is placed at right angles to the same, its edges squared or rounded off. A self-flushing box-trap is connected to the hinged end of the grid of the drain. This trap has two arms so arranged that the water is on a level with the top of the box, instead of on a level with the bottom of the outlet or discharge-pipe, as is usual. When the drain requires flushing, this is instantaneously and perfectly secured by simply raising the grid, and the apparatus forms a perfect seal against the passage of noxious gases and bad smells.

15,299. **ELECTRIC DOOR FASTENINGS:** J. Gorup. This invention has reference to electric apparatus for opening or closing doors by means of a lever, without unfastening or fastening of doors, or both these operations, may be accomplished from any suitable point inside or outside a room. The construction of the apparatus varies. For the purpose of opening a door closed by a spring catch, this latter is connected to a lever, one arm of which is connected to an electro-magnet. The door is unfastened by pressing down a clamping key, which closes an electric circuit, magnetises the iron core of the electro-magnet, and attracts to the latter one arm of the lever in such sort that the other arm draws back the spring catch. In another form of construction the two-arm angular lever, which acts upon the catch, is replaced by a four-arm lever mounted to turn on a central pivot vertically, which is also actuated by an electro-magnet and battery. There is still another form of the apparatus where, instead of the four-arm lever just spoken of, a two-arm lever is rotated by means of a stud projecting from the back of a revolving spring casing. The apparatus may be provided with a bell, operated by the arms of the revolving lever, so as to give signals.

15,498. **MACHINERY FOR PRESSING BRICKS, TILES, &c.:** J. Hamblett. This invention is primarily designed to enable a hanging or pivoted latch-head to be used in the same case with a locking bolt, and the latch spindle to be so arranged that a latch case would be available. The latching mechanism consists of a latching head, having a short up-and-down shank, of which the upper end is pivoted within and near the hinder end of the case and beneath the locking bolt, and is actuated by a double-borne follower or the latch spindle. The locking mechanism may be of the usual or any convenient description.

17,380. **MACHINERY FOR PRESSING BRICKS, TILES, &c.:** J. Hamblett. This invention consists of improvements in the pressing machinery described in Specification No. 2,656 (June 30, 1893). The present modification of that apparatus is by the adaptation to the pressing machine of a spring brake, in place of the weighted sliding brake described in the former specification. The new brake consists of four uprights fixed to the cross head of the press, and furnished with accessory parts, which form a brake acting as follows:—As soon as the screw of the pressing machinery has risen nearly to the required height, the friction disc, giving the rotary motion to the driving wheel in the direction proper to raise the screw, is withdrawn from the said wheel, and the screw is brought to rest and held in its raised position.

22,036. **WATER-CLOSETS:** W. J. Freeman and E. Freeman. In pedestal closets of the type known as "wash down," this invention proposes to form the closet-pan of one piece of glazed earthenware, and the pedestal and trap in another piece, either of glazed earthenware also or of suitable material. This will ensure cheapness of production, and in case of breakage only one portion would be required to be replaced. The pieces would be suitably formed to suit the system.

29,109. **WINDOWS:** A. Welis. The purpose of this invention is to provide improved devices to be used for the adjustment of opening a window of that class in which the window-sash is hinged to the frame; these devices, consisting of two members (one a pivotted rod, and the other a disc, provided with holes or recesses to gear with a rack on the rod), the one attached to the frame, the other to the sash, adapted to engage in different positions the one with the other.

9,529. **FIREPROOF FLOORS:** J. T. Chappell. This invention relates to the better and more perfect construction of fireproof floors of brick or other incombustible materials, such as are placed in the spaces between iron girders, to support concrete. The tubular limits of this invention are to be connected with the girders by "notching" the usual manner. These limits are formed with an outward bulge at each side, so that when the concrete is filled in

between them it has to assume a dovetail form between each pair, and thus the floor is thoroughly keyed together.

NEW APPLICATIONS FOR LETTERS PATENT.

JULY 17.—13,802, C. Korte, Flushing Tanks for Closets and Cisterns.—13,804, G. Cunciffe, Nails.—13,826, J. Kennedy and J. T. Whittle, Water-closets and manner of Discharging, Flushing, and Ventilating same.—13,828, F. Cobb and A. Oldham, Sash-fasteners.—13,844, W. Hassall, Furnaces for Pottery and other Kilns.

JULY 18.—13,895, J. West, Device for Clearing the Waste Pipes of Sinks, Lavatories, and Baths.—13,902, E. and A. T. Box, Self-acting Ball Trap for House and Sewer Drains and Closets.—13,936, J. Shannon, Wood-graining Machines.

JULY 19.—13,958, F. W. Baker, Window Fastenings.—13,962, F. C. Lynde, Connecting Bends of Drain and other Pipes.—13,964, F. C. Lynde, Intersecting Grids for Gully and other Traps.—13,965, F. C. Lynde, Siphon and other Traps.—14,004, J. Budd, Brushes for Dispersing Walls, Ceilings, &c.

JULY 20.—14,025, J. A. Towle, and W. G. Stones, Automatic Window Sash-lifter and Adjuster.—14,041, E. Smith, Chimney Cows.—14,077, E. Sprenger, Door-latch or Fastener.—14,081, E. Bannister, Foot Paving.

JULY 21.—14,126, J. Davies, Manufacture of Bricks.
JULY 22.—14,177, W. Longmore, Water Gutter or Spouts.—14,185, Williamson, Window-sashes and Frames.—14,186, H. S. Gledhill, Saws for Cutting or Sawing Stone.—14,195, W. Cooper, Ventilators.—14,193, F. W. Barker, Window-sashes.—14,204, J. Jones and S. H. Rowley, Water-closets.

PROVISIONAL SPECIFICATIONS ACCEPTED.

9,101, R. Anderson, Self-acting Waste-water Flushing Chamber.—9,354, H. Winks, Compound Metal and Indulder Pipe to prevent Bursting from Frost.—12,913, F. Ashwell and D. Nesit, Heating and Ventilating, 12,117, F. Clarkson and others, Automatic Disinfecting Apparatus for Sewers, Drains, Water-closets, Urinals, &c.—12,154, R. Knights, Bent Plates used for Bridges, Floors, &c.—12,494, H. Chubb, Waste-preventing and Flushing Cisterns for Water-closets, &c.—12,540, J. Naylor, Lead Traps.—12,659, E. Green, Channel Blocks and Reducing Couplings for Manholes and Inspection Chambers in connection with Pipe Sewers and Drains, &c.—13,773, J. Wallace, Hanging Cupboard or Wardrobe.—13,042, H. Jones, Gauge for Woodworkers.—13,173, B. and W. Cannon, Wood Stains.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

12,245, E. Turner, House or Sewer Drains.—14,218, W. Dick, Gas Pipes.—16,415, M. Turpin, Parquet Floors and Wall Linings.—16,843, J. Rostrom and J. Hilton, Imitation tile-suitable for Hearths, Grates, &c.—17,046, C. Manchip and R. Foley, Roofing Tiles.—20,847, J. Knight, Radiator for Warming Buildings and Utilized Heat Wasted in Chimneys.—2,626, M. Becker, Process for Producing a Fundamental Mass from which Varnish and similar Coatings may be made.—2,650, C. Porter, Gun, Slide Hinge, 7,316, G. Holy, Sash Frames and Pivoted Sliding Sashes.—10,407, A. James, Hanging Window Sashes, &c.—11,882, A. Boulit, Builder's Level.—11,883, R. Gassner, Closet Flange.—12,320, A. Boulit, Extensible Shutters, Doors, &c.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

JULY 11.—By Wilkinson, Son, & W. L. H. (at Brighton): "The Hall," Southwick, and five cottages, 1,150l.
JULY 20.—By Messrs. Cobb (at Maidstone): 12 houses, cottages, and a plot of land, Lenham, Kent, 1,500l.—By Wilkinson, Son, & Welch (at Brighton): 40, 42, Clarendon Villas, Hove, 1 r. 100l., 1,530l.
JULY 22.—By F. Hudson: 108, 110, Queen's-road, Finsbury-pk., ut. 83 yrs., g.r. 25l. 4s., 1,794l., 1,495l.; 135, Isledon-road, ut. 66 yrs., g.r. 71l. 15s., 305l.—By R. Tidy & Son: Figs. of 152, St. Jude-st., Millmays-pk., rever. 35 yrs., g.r. 450l.—By J. H. Bell: 30 to 38, Havelock-road, Hackney, ut. 62 yrs., g.r. 21l. 9s. 6d.—By J. Chaffell: Figs. of 241, Newton-road, Wimbledon, reversion in 30 yrs., 400l.—By Russell & Edwards: "Bottom Farm," Redbourne, Kent, containing 71 a. 1 r. 3 p., 1,750l.—"Baker's Farm," 49 a. 2 r. 20 p., 1,000l.—an enclosure of land, 18 a. 1 r. 3 p., with "The Manor of East Brook Hay," 290l.—"Agnell's Farm," 81 a. 3 r. 1 p., 1,500l.—"The Manor of Agnell's," 105l.; four f. cottages, and straw hat factory, 6 1/2 a. 58l.; 700l.; 4 stalling and outbuildings in Fish-st., 125l.; enclosures of land, 212 a. 8 r. 12 p., 3,610l.

JULY 25.—By Bullett, Baker, & Co.: 88, Gloucester-st., Hyde-pk., ut. 49 yrs., g.r. 21l. r. 175l., 1,955l.—By Bean, Burnett, & Co.: 77, Unfleville-road, Finsbury-pk., ut. 95 yrs., g.r. 71l. 25s.—By Furber, Price, & Furber: 158 to 161 (even), Hill-st., Walworth, 1,760l.—By A. Blackford: "Walm House" with grounds, Willesden Green, 1, 1,231l.—By Debenhams, Trueman, & Co.: 2, Loveridge Mews, Brondesbury, ut. 82 yrs., g.r. 41l. 4s., 200l.—By Alder & Co.: 1 to 4, Albert-road, Teddington, 1,745l.—By Trueman, Ellis, & Co.: 12 to 24, Church-st., Marylebone, ut. 28 yrs., g.r. 30l. 20s., 2,195l.; 25, 26, Exeter-st., ut. 38 yrs., g.r. 14l. 4s., 400l.; 34, Earl-st., ut. 22 yrs., g.r. 10l. 10s., r. 30l., 185l.; 30, North-st., ut. 30 yrs., g.r. 6l. 4s., 355l.—By J. Millar: 25, 26, Church-st., Stoke Newington, and 17, Fountayne-road, including mortgage, 750l.—By Cooper & Goulding: 200, Brecknock-road, Fulham-pk., ut. 76 yrs., g.r. 8l. 8s., 500l.; 384, 384, 386, York-st., Wandsworth, ut. 85 yrs., g.r. 55l. 3d., 1,100l., 950l.; 388, York-road, ut. 83 yrs., g.r. 13l. 4s., r. 55l., 550l.—By Charles & Tubbs: 41, 45, 49, 57, Acton-st., King's Cross, ut. 48 yrs., g.r. 84l. r. 125l., 840l.

JULY 26.—By A. Preston & Son: 28, Bancroft-road, Mile End, ut. 64 yrs., g.r. 5l. 5s., 510l.; 20, 22, Nottingham-st., Bethnal Green, ut. 25 yrs., g.r. 10l. 10s., 125l.; 21, 43, John's Hill, St. George's-in-East, 1, 284l.; 12 to 14, Chopping-street, 1, 284l.; 15, 16, Great Heath-st., Wapping, 1 r. 30l., 300l.; "Glyn Villa," Ferndale, Leytonstone, 1 r. 35l., 435l.; a plot of f. land, Longquard-road, 100l.—By C. P. Whitley: 7, 8, Boxworth Grove, Barnsbury, ut. 48 yrs., g.r. 16l., 640l.—By R. A. Knight: 47, Verbury-road, Holloway, ut. 75 yrs., g.r. 7l. 10s., 165l.; 6, Kintore-st., Bermondsey, ut. 28 yrs., g.r. 31l., 555l.; 6, Brodie-road, Stoke Newington, ut. 80 yrs., g.r. 10l., 555l.—By D. Young: 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

LONDON.—For removing a temporary iron building from the Littlewood site, Fulham, and for erecting it on the Laxon-street site, Bernadsondy, for the Schoo. Board for London, Mr. T. J. Baily, Architect.—

Crosgon & Co., Limited	£212 10	T. Crawys, Caroline.
W. Harbrow	232 0	street, Camden Town* £12 0
D. Charteris	215 0	

* Recommended by the Works Committee for acceptance.

ILLUSTRATIONS.

Royal School of Art Needlework, Imperial Institute-road.—Mr. Fairfax B. Wade, F.R.I.B.A., Architect *Double-Page Ink-Photo.*
 Ashby Folville Manor, Leicestershire: Front Entrance.—Mr. John Ely, F.R.I.B.A., Architect *Double-Page Ink-Photo.*
 Brick Frieze, Imperial Bank, Peckham.—Mr. E. T. Hall, F.R.I.B.A., Architect *Double-Page Ink-Photo.*
 Lodges, Springhill, Worcestershire.—Mr. E. Guy Dawber, Architect *Double-Page Photo-Litho.*

Blocks in Text.

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 Plans, Ashby Folville Manor, Leicestershire PAGE 123

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The Nicaragua Canal Scheme.



WHILE the Panama Canal scheme has occupied the public mind for the last fifteen years, and even still affords an occasional paragraph to the newspapers, the

proposal to connect the two oceans by the Lake of Nicaragua and the San Juan river has been passed over almost in silence, and yet that route has been favourably regarded as the most feasible one from the days of Antonio Galvao, 400 years ago, to the present time. The demonstration made by the French at Panama certainly looked as if that route was thought practicable at the time, and, no doubt, some persons connected with the enterprise believed in it. At the same time, those who had made the trans-isthmian canal a serious study adhered steadily to their opinion that a tide level canal was impossible anywhere, and that a canal with locks was only possible (commercially speaking) by the way of the Lake of Nicaragua. It will be seen later on that they had the courage of their opinion, and during the whole time of the exploitation of the Panama scheme they continued the work of exploration and examination, and, at last, actually began the construction of the Nicaragua Canal.

In order to show how expert opinion preponderated in favour of Nicaragua, it will be necessary to review the whole history of trans-isthmian canal schemes, to do which we must go back to the days when Columbus first attempted to find a passage for his ships across it, when in the year 1492 he sailed over the Atlantic in the hope of discovering a westerly route to the Indies. He failed, but Magelhaens, in 1497, found the straits that bear his name. Their position, however, 3,000 miles south of the Equator, did not do much towards realising the scheme of a direct route to the West.

By 1520 it seems to have been recognised that no natural passage existed between the two oceans, and that a canal would have to be made, for on a globe made by one John Schöner in that year a projected canal is said to be clearly indicated.

In the time of Philip II. the historian Gomera tried to interest that monarch in his schemes for an interoceanic canal, but his Majesty was too full of his plans for the conquest and conversion of England to pay attention to the improvement of his own empire, and 200 years later we find the Viceroy of Central America being censured by his royal master, the King of Spain, for presenting a memorial from the people of Oaxaca praying for imperial assistance in carrying out the then proposed canal *viâ* Tehuantepec.

In 1808, Humboldt tried to arouse a little enthusiasm on the subject of a canal, but nothing came of it at the time.

In 1826, Mr. A. H. Palmer, an American, contracted with the Government of Central America to construct a canal *viâ* the Lake of Nicaragua, but the contract failed on account of Palmer's lack of funds, and the meagre character of his surveys and preliminary work. On his withdrawal, the King of the Netherlands at once took up the concession, and in 1829 sent an envoy to treat with the Central American Government. He arrived at an unlucky time, and had to wait until political matters had quieted down, but in 1830 he had got so far on with his negotiations that the concession was about to be offered to the king when the separation of Belgium from Holland occurred, and the canal scheme again dropped.

In 1837, Lieutenant Bailey, a half-pay officer of the English navy, but in the service of the Central American Government, made surveys for a canal in Nicaragua, and in 1846, Prince Louis Napoleon Bonaparte was interested in a similar scheme, but the events of 1848 caused him to turn his attention to matters of greater personal interest, and again the canal was dropped.

And now Great Britain appears on the scene, and by seizing the port at the mouth of the San Juan river she placed herself in a good position for securing the control of the canal whenever it should be built. Unfortunately she did not retain this advantageous position, and it is not probable that she will ever be able to regain it.

In 1850 a survey of the Nicaraguan route was made for Cornelius Vanderbilt (the father of W. H. Vanderbilt), who had obtained a concession from the Nicaraguan Government for a canal, and for a transit

company. This was the first really important survey made right across the isthmus, and by it was discovered the fact that on this route occurs the lowest depression along the whole range of hills that forms the Isthmus of Darien. The following is the list of the eight routes that have been proposed:—

	150 miles long.	Height of lowest depression in hills.
Tehuantepec	150	755 feet.
San Blas	30	1,145 "
Caledonia Tuyra	87	1,008 "
Atrato Tuyra	115	800 "
Atrato Truando	125	950 "
Atrato Napipi	180	778 "
Nicaragua	169	153 "
Panama	41	295 "

This concession fell through like its predecessors, and in 1858 another concession for a canal by the Lake of Nicaragua was obtained by a Frenchman named Belly, but he also fell on troublous times, and was unable to raise the necessary funds for his enterprise.

In 1872 Mr. A. G. Menocal, an officer in the United States Navy, began, under instructions from the United States Government, a thorough investigation of the route, which he completed twenty years later for the present Canal Construction Company, and which has established beyond any doubt the superiority of the Nicaraguan over any other route for a trans-isthmian canal.

In 1879 it had been recognised that of the eight routes above enumerated, only three were by any means practicable, though the American Government went further and denied the practicability of any except the Nicaraguan. These three were the Nicaraguan Canal, with locks, the Panama Canal at tide level, and Colonel Eads' scheme for a ship railway at Tehuantepec.

This last was the first to succumb—indeed, it is doubtful whether it would have lived as long as it did had it not been sustained by the great reputation of Colonel Eads, gained by his successful work on the Mississippi.

Of the Panama scheme, it is unnecessary to say more in this place. The credit of M. Lesseps supported it for a good deal longer than the merit of the scheme deserved. He promised to construct a tide level canal between Colon and Panama in seven years for 20,000,000*l.* Fourteen years have passed since this promise was made, 52,000,000*l.*

have been expended, and not a quarter of the work is completed.*

Immediately after the Paris Congress of 1879 had decided that a tide-level canal between Panama and Colon was possible, Mr. Menocal and Rear-Admiral Ammen, the two United States delegates to the Congress, having done their best to show the falseness of that view, returned to the States and took an active part in the organisation of a "Provisional Inter-oceanic Canal Society" to cross the isthmus *via* the San Juan River and the Lake of Nicaragua with locks.

Without entering into all the details of the work that has since been accomplished by Mr. Menocal, as chief engineer to the company in Nicaragua, the following brief account of what has been done must be given in order to show that the data upon which he has based his calculations of the cost of the canal, and his proposals for the carrying-out of the work, are not mere guess-work, but the result of solid study of the results of instrumental measurements of the surface of the ground, of the strata of which it is composed, and of the bottom of the lake.

A belt of country ten miles wide has been surveyed and contour lines every 10 ft. have been taken from Greytown on the Atlantic to Brito on the Pacific Ocean. Numerous borings have been made with the diamond drill at the site of every large embankment, and every lock or other important masonry work and every cutting. The samples of rock brought up by the drill have been preserved and registered for future reference. The total length of survey lines made is about 5,000 miles.

One of the first works that claimed the attention of the company was the obstruction caused to the harbour at Greytown by the bar formed right across its mouth by the San Juan river, which, in 1860, completely closed it up. By the simple operation of running out a breakwater of creosoted piles backed by mattresses and filled in with cement concrete (which is now 1,000 ft. long), aided by a little dredging, the bar has already been very much reduced, and there is now 15 ft. of water where a few years ago there was a sand-bank 4 ft. high. It is intended to prolong this breakwater another 2,000 ft., and then give it a backward curve till its tangent is at right angles to the course of the sand brought up from the coast of Costa Rica by the prevailing winds. When the triangle thus formed is filled up, it will be an easy matter to extend the breakwater if it is found to be necessary. The entrance channel will be 30 ft. deep and 500 ft. wide, and at that depth there will be 200 acres of harbour.

About eleven miles of railway have been built from the harbour at Greytown towards the Divide cutting, which occurs at mile sixteen. This short railway gave a great deal of trouble, for it runs over a swamp for six miles of its length, and had to be laid on a corduroy composed of rough logs laid transversely, across which longer logs were laid as stringers, and the sleepers were spiked on to these. All this work had to be done by men working up to their waists in water. When the sleepers were in position, and the rails laid, sand was brought from the spoil banks on the edge of the canal, which was by that time begun by two dredgers. It was shovelled up on to the waggons by a steam navy capable of handling 1,300 cubic yds. a-day; the waggons were without sides, and on the last one was a plough. When this ballast train arrived at its destination the waggons were anchored to the rails, the engine uncoupled, and a rope from the plough attached to it, the engine moved slowly forward, dragging the plough with it,

which swept in its passage all the sand down on to the roadway. There are four of these locomotives and fifty waggons.

Permanent buildings, the beginning of a new town, have been erected on the beach at Greytown. They are made of pine, with galvanised iron roofs, and comprise officers' quarters, barracks, hospital stores, shops, &c.—in all, thirty-nine buildings, covering nearly 76,000 square ft. of floor.

Wharves, equipped with steam-cranes, &c., have been constructed; telegraphic communication has been established between the towns of the interior, the company's different stations, and the ocean cables; three miles of canal on the Atlantic side has been excavated, and twenty miles has been cleared of timber and undergrowth for a width of 486 ft.

The fine dredging plant that was used by the American Contracting and Dredging Company at the Panama Canal has been purchased. It consists of seven of the largest dredgers in the world (each capable of excavating 10,000 cubic yards of mud a day), two tug-boats, twenty lighters, and several launches, &c.

Another most necessary purchase that has been made by the company is the exclusive right to the steam navigation of the San Juan River and the Lake, together with all the offices, lands, and boats belonging to the Nicaraguan Mail Steam Navigation Company, a company which was the outcome of the concession obtained for a canal and navigation company by Mr. Vanderbilt forty-five years ago, to which reference has been made in an earlier part of this article.

The capital expended in accomplishing the works above enumerated has reached a total sum of five million dollars, by which expenditure the conditions of Article XLVII of the contract have been fulfilled, and the title of the concession has received the formal acknowledgment of the Nicaraguan Government, thus securing to its proprietors a term of ten years in which to complete the canal and open it for traffic.

Proceeding now to the proposals formulated by Mr. Menocal for the construction of the canal, the first point to be noticed is the Lake of Nicaragua in its position of reservoir to the river San Juan. This is a most important point, diminishing as it does the risk of floods, and supplying water for working the locks in inexhaustible quantities.

The Lake of Nicaragua is about 110 miles long, by 40 miles broad, and, in places, as much as 240 ft. deep. The river San Juan has a drainage area of 8,000 square miles, of which the lake surface occupies about 4,000 square miles, and an average rainfall of 80 in.; it is 121 miles long, and 100 yds. to 400 yds. wide. In its upper course it is from 10 ft. to 20 ft. deep, but is interrupted by several rapids.

Owing to the huge storage capacity of the lake the river is not subject to those disastrous floods that render the canalisation of other tropical streams so difficult. The water in the lake never rises more than a foot or two after a period of the heaviest rainfall, and thus the discharge is equalised.

It was proposed at first to make a series of locks and low dams, and to overcome the rapids in the river one by one, but Mr. Menocal proposed, by one huge dam and several embankments, to overcome them all at once, and to add sixty-four miles of river to the lake at one level. The plan is a bold one, but it is based on carefully-ascertained facts, and there seems no reason why it should not be successfully carried out.

Starting from Greytown, the first reach of the canal will be nine and a quarter miles long, and extend from the harbour, through alluvial soil, to the foot of the first low hills at sea-level; the width at the bottom will be 120 ft. (the Suez Canal measures 70 ft. at bottom) and 288 ft. at the surface, and the depth will be 28 ft. This will form an extension of the harbour, as ships can moor alongside, leaving plenty of room for others to pass them.

Lock No. 1 occurs at mile nine and a

quarter, and, like the other five, will be 650 ft. long by 80 ft. wide; it will have a lift of 31 ft.

Lock No. 2 at mile ten and a half will have a lift of 30 ft. The mile and a quarter of canal between locks 1 and 2 will be formed almost entirely by means of a dam, and several embankments of moderate size, by which the waters of the little stream Desado will be raised to the required height above the bottom of the valley, thus materially reducing the quantity of excavation, and making a fine basin in which ships can pass each other easily.

Lock No. 3 will be at mile twelve and a quarter, will have a lift of 45 ft., and bring the canal to the level of the lake, $\frac{3}{4}$ in. per mile being allowed for the calculated discharge.

The two miles between locks 2 and 3 will be formed into a basin in the same way as the mile and a-quarter between Nos. 1 and 2. As two and one-third million cubic feet of water will be required for each lockage, one very important function of these artificial lakes will be to act as reservoirs for the supply of water, for if the water for each lockage had to be drawn from the narrow channel of the canal itself it would cause injurious currents, and seriously interfere with the level of the canal, unless the lockages were done very slowly, in which case the canal could never pass the estimated tonnage. The water from lock 3 to the lake, a distance of eighty-three miles, is mainly kept up by an enormous dam at Ochoa, a place where the river banks approach very close to each other. It is to be 70 ft. high and 1,900 ft. long. As several gaps occur on the Costa Rican side of the river, it will be necessary to construct a good many smaller embankments as well. The aggregate length of these embankments is 12,600 ft. on the crest, with a maximum height of 60 ft., and in addition to these there will be fifty-nine minor embankments, with an aggregate length of 16,770 ft.

At mile sixteen the divide is pierced by a heavy cutting. As will be seen from the map, the canal up to this point has been in excavation, but the piercing of this divide admits it into the valley of the San Juan river. The cutting might have been avoided by following the course of the river the whole way to the sea, but this would have made the canal twenty miles longer, and have entailed the construction of several more locks, and caused considerable difficulty in the disposal of surface drainage. An additional reason is found for piercing the divide in a direct route to the San Juan river at Ochoa in the fact that the rock from the cutting will be all required for the breakwater, the locks and other masonry works, the embankments, and for pitching the sides of the canal, and that the cutting is situated in a convenient position for these purposes, and is moreover about the only place where rock can be found in sufficient quantity in the neighbourhood.

The cutting will be three miles long, and in one place it will be 298 ft. deep for a short distance; it is, however, mostly through rock, which will simplify its construction very much. The average depth of cutting is 141 ft.

From Ochoa to the lake the river channel will be about 1,000 ft. wide, and from 28 to 130 ft. deep for thirty-six miles of the distance, and for the twenty-eight miles from the Toro rapids to the lake, where some rock blasting will be required, the river channel will be deepened 4 or 5 ft., and have a bottom width of 125 ft., and a top width of from 500 to 1,500 ft.

For fourteen miles from the shore the bottom of the lake will have to be dredged in soft mud to a depth of 10 ft., and a width of 125 ft., to give a channel 30 ft. deep.

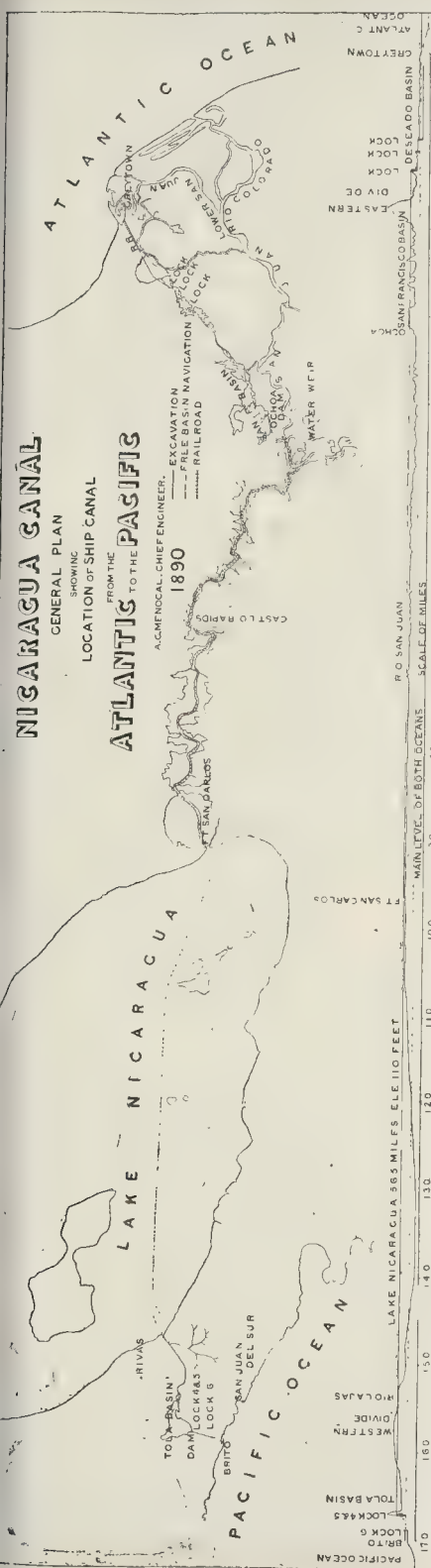
The canal makes use of the lake for fifty-six miles, of which forty-two will require no dredging, as the water is from 30 to 150 ft. deep.

For about nine miles beyond the lake on

* Total amount spent, as reported by the liquidator

= 1,300,000,000 fr., or 52,000,000 £, as follows:—	
Preparatory work and organisation	£7,000,000
Concessions and general expenses	2,560,000
Advertisements, taxes, &c.	3,500,000
Construction, material, and transport	6,640,000
Contractors	17,720,000
Purchase of Panama Railroad	3,720,000
Paid to shareholders as interest	10,840,000

£52,000,000



the Pacific side the canal will be in excavation, in which another divide 43 ft. deep must be cut through. The canal will have a bottom width here of 80 ft. for about five miles. On the Pacific side of this divide the Tola basin will be formed by the construction of a large dam at La Flor, 1,800 ft. long and 70 ft. high; the basin thus formed will be five miles long, and 30 to 70 ft. deep for one mile of its width.

Lock No. 4 at mile 166 will have a lift of 42 ft. 6 in., and Lock No. 5, which will be quite close to No. 4, will have the same lift.

Lock No. 6 at mile 167½ will have a lift varying from 21 to 29 ft., according to the tide. The canal between locks 5 and 6 will be 80 ft. wide at the bottom, and 184 ft. wide at the top. From No. 6 to the Pacific port at Brito the bottom width will be 120 ft., and the top 288 ft. at sea-level, thus making an extension of the port of Brito for one and a-half miles inland in the same way as the first nine miles on the Atlantic side makes an extension of the port of Greytown.

Besides the safeguards against damage from floods afforded by the lake and the artificial basins, ample precautions will be taken in the way of weirs and guard-gates.

The harbour at Brito will be formed by a breakwater 900 ft. long, running out from the mouth of the Rio Grande, which discharges itself into the Pacific Ocean at this point. This breakwater will be nearly met by a jetty, 830 ft. long, running out from the other side of the river's mouth. By this means, and by excavation in the alluvial soil which forms the shore, about 100 acres will be secured for the harbour, and there will be about 100 more in the canal reach, as above explained.

An important point that remains to be discussed is the capacity of the canal to pass the tonnage that will be required to pay the interest on the capital used in construction.

The cost of the canal was estimated by Mr. Menocal at 65 million dols., but a committee of engineers, who reported on the estimates, added 14 millions for contingencies, and brought it up altogether to 88 millions, to which 20 millions must be added for interest during construction, the total cost thus amounting in round figures to 108 million dols. Five per cent. interest on this sum is 5,400,000 dols., and the anticipated traffic, 6,500,000 tons per annum, will, at a very reasonable toll, pay this interest and leave a sufficient margin for maintenance.

It has been found that with one basin ten miles long, out of a total length of 100 miles,

and with a bottom width of channel of 70 ft., the Suez Canal is barely able to cope with a yearly traffic of 6,000,000 tons, but, as has been seen, the width of the Nicaragua Canal will never be less than 80 ft., and will be that width for only thirteen and a quarter miles, while it will have 156 miles with a minimum width of 120 ft., of which fifty-six and a half miles will be in the lake itself, and twenty-one and a half in basins, so that as far as space is concerned, there need be no apprehension of its failing to pass the traffic. But fears have been expressed lest the six locks will obstruct the traffic. There is a good example of the kind of lock which will be used on the canal at St. Mary's Falls, connecting Lakes Superior and Huron; it is 515 ft. long, and 80 ft. wide, it is filled in eleven minutes, and emptied in eight minutes. In 1889 4,684 vessels, carrying 7,516,000 tons of freight, were passed through this lock, and in 1890 9,000,000 tons were passed through—an average of about 1,000 tons an hour.

It must be remembered, too, that the season for navigation in the St. Mary's Falls is only seven months in the year. During the other five it is closed by ice. Thus in 1891 the canal opened for traffic on April 27, and closed again on December 7, which gave only 225 days out of 365 for passing its enormous traffic.

But this is fortunate, as far as our purpose is concerned, for it affords a very good proof of what can be done by a lock well constructed and well worked. In this season vessels passed through the lock, on an average, to the number of 453 a day, while during the four months of June, July, August, and September the average daily number was 546—more than two an hour!

In the season of 1892, 11,557 vessels, carrying 10,107,603 tons of freight, passed through the canal. 5,615 lockages were required for this traffic, at a cost per lockage for repairs, administration, &c., for the whole year, of 10.95 dols. These figures require no comment; they can be verified, and they speak for themselves.

For a lockage on the Nicaragua Canal forty-five minutes is allowed, which will permit a maximum of nearly 20,500,000 tons being passed through in the year. Clearly, then, the locks will not prevent the anticipated 6,500,000 tons from passing.

The following table gives the time that it is estimated a vessel will require to travel from Greytown to Brito, or *vice versa*—

	H. M.
7.81 miles narrow canal at 2½ miles per hour	3 4
18.789 " broad " "	5 " 3 38
21.619 " basins " "	7 " 3 5
64.540 " S. Juan River " "	8 " 4
56.500 " Lake Nicaragua " "	5 39
Lockages, 6 at 45 minutes each	4 30

169.448 miles. Total time of transit 28 0
Average time of transit at Suez, 100 miles, 24 hours.

A good deal has been said about the danger to the canal that may be apprehended from earthquakes. (It may be observed that similar fears were expressed in the case of the Suez Canal about sandstorms). There are earthquakes, no doubt, in Central America. Indeed, they occur with great frequency, but it is an equally undoubted fact that clumsily-built top-heavy structures, erected by the Spaniards both on the line of the canal and in greater vicinity to the active volcanoes, have stood for centuries, and it may therefore be fairly expected that submerged structures like locks, and broad-based structures like earthen banks will also stand.

The fact that buildings are destroyed by earthquakes does not interfere with this argument, it is sufficient that some stand, it is more than sufficient that *nearly all* stand.

This completes, in a very brief and cursory manner, the history of the Nicaragua Canal up to the present day. The object that has been held in view in writing it has been to show that the consensus of expert opinion has always been in favour of this route for the canal, and that the present proprietors of the enterprise have shown such a dogged

determination to carry it out during the last fourteen years that it is no idle dream to believe that the great work is about to be accomplished.

Of the new life that it will bring to commerce volumes might be written, but it does not fall within the scope of this article to deal with that aspect of the undertaking further than has already been done. Nor is it advisable here to enter into the political difficulties, which are offering an even stronger resistance than physical obstacles.

Is it still too much to suppose that Great Britain and the United States will throw aside their jealousies and, for once, co-operate together for the accomplishment of the greatest work that human skill has yet devised? Is it too much to hope that these two great nations will stop their useless squabbles as to which is to receive the greater share of the advantages the canal will create, and unite together to construct that source of wealth for all the world? They are neither of them likely to lose much by it, if we may be guided by past history.

THE COMPETITION FOR BATHS AND WASHHOUSES, ST. MARY, NEWINGTON.

THE ten designs which were submitted in this competition have been exhibited during the last few days at the Newington Vestry Hall, Walworth-road. The competing architects were asked by the Commissioners to send in designs, and the conditions state that Mr. Rowland Plumbe would act as assessor. In the assessor's award the first place and premium of 150*l.* has been allotted to Mr. E. B. l'Anson, the second premium of 100*l.* to Mr. Charles Bell, the third of 75*l.* to Messrs. Spalding & Cross, and the fourth of 50*l.* to Messrs. Harner & Pinches. The site chosen was in Manor Place, Walworth, and was shaped with frontage only to Manor Place. In addition to this space three arches under the London, Chatham, and Dover Railway were available for the requirements of the establishment. The accommodation asked for in the conditions included the provision of first and second class swimming-baths for men, a ladies' swimming-bath, twenty first-class and thirty-five second-class slipper baths for men, ten first-class and fifteen second-class baths for women. A public laundry naturally formed part of the scheme, with complete fittings. The accommodation for the establishment also had to include board-room, offices, &c., and residences for the superintendent and the engineer. The provision of establishment laundry, and the necessary engine, boiler, and dynamo-rooms was also required. The stipulated price for the buildings was 35,000*l.*, with a margin of 10 per cent.

Considerable diversity has been shown by the competing architects in the arrangement of their plan, and though the points to which the assessor seems to have attached most importance appear to have been economy of administration in the first place, and then the provision of all the baths on the ground floor, several of the competitors were found to have placed their entrances in such a position as to necessitate two ticket offices, whereas the simplest arrangement is to so arrange the entrances that one ticket office will suffice for the whole establishment. The arrangement of the largest swimming-bath for the purposes of a public hall during the winter months was another point where divergence of opinion showed itself; several competitors show carefully-arranged exits direct to street, whereas others appear to have lost sight of the requirements of the County Council in granting a licence.

Mr. E. B. l'Anson places the first-class swimming-bath at the back of the Manor-place block, the second-class bath at the back of the side block, and the ladies' swimming-bath at the corner. This arrangement gives access from Manor-place by a

double entrance, with one ticket office between to the swimming-baths and the slipper-baths, which are grouped with the swimming-baths. The public laundry then occupies a position next the railway, under the arches of which are placed the mangling and ironing rooms, whilst the third arch is devoted to a coal store. The several sets of baths are provided with waiting rooms, and a feature is made of a refreshment room and club room near the main entrance. The basement accommodates the engine, dynamo, and boiler rooms, and the establishment laundry, whilst the first floor is devoted to Board room, clerk's office, and dwelling rooms for engineer and superintendent, part of which are placed on the second floor. The elevations are designed in a quiet style, suited to the character of the building.

Mr. Charles Bell's design shows considerable similarity to the last named in the portions allotted to the three swimming-baths. An official entrance has been provided in Manor-place, and the board room, clerk's office, and cloak room face the street, whilst a corridor divides these and a club room adjacent to the bath at the back. The engineer's and superintendent's dwelling-rooms are placed on the first floor. Messrs. Spalding & Cross contribute a carefully thought-out design, the general arrangement of the baths coinciding to a great extent with the former two. The position of one of the waiting-rooms, so that the main communication with the second-class swimming-baths runs through it, does not seem to be entirely desirable. The elevations are distinctly good. Messrs. Harner & Pinches adopt a different plan, and have placed the ladies' swimming-bath next to the laundry, with the women's slipper-bath on the first floor, so that the laundry office may be available. The corridor to second-class swimming-bath has thus been carried along the boundary with the ticket-office at the end of the Manor-place frontage. A high average of excellence appears to distinguish most of the ten designs submitted, and all appear to have been prepared with great care. The assessor does not appear to have agreed with many of the competitors on the estimate of the cost of their designs, and cost seems to have influenced him to a considerable extent in his award.

NOTES.

THE ramifications of opinion as to the Megalopolis theatre threaten to increase in complication. In a recent article on the "Supplementary Papers" of the British School at Athens on Megalopolis, we noted the fact that Mr. Loring had at the last moment indicated his dissent from some of the views expressed in the chapter jointly signed by himself and Professor Gardner. From a letter from Mr. Loring in last week's *Athenaeum* it appears that his dissent was intended to be much more decisive than the editor of the "Supplementary Papers" had allowed it to appear, and that he now even "apologises to Professor Gardner for having so long agreed with him," and ranges himself on the side of Dr. Dörpfeld. The latter explains the fact of the portico of the Thersilion being on a higher level than the orchestra of the theatre, and without steps of the same date to connect them, by the supposition that there was originally a theatre at a higher level, and that the present remains are those of a second theatre on a lower level than the first one. Mr. Loring's change of position is based on a revised opinion in regard to certain technical comparisons. Professor Gardner (and Mr. Loring at first) had regarded the work and tooling of the theatre seats as of the same class as that on the upper steps of the Thersilion, showing that they were built at the same time. He now thinks that these appearances have been deceptive; that the theatre seats are of the same date as the lower, not the upper steps of the Thersil-

lion; and that the contrary opinion which he had at first held, and which Professor Gardner still holds, was due to neglecting the effect of weathering on the lower steps of the Thersilion. The objection to this theory is that the foundation of Megalopolis was 370 B.C., and the theatre steps show inscriptions which cannot well be later than about 340 B.C.; we have therefore to include with this theory the supposition that the large theatre was recast and made over again within thirty years after its first establishment. This will appear (to everyone who has not a pet theory to support) very improbable in itself. Professor Gardner's theory that there had been a raised stage in front of the Thersilion portico, which had been subsequently removed, is, as we have already suggested, an almost entirely gratuitous assumption—the argument being that this explains the remains and nothing else does—but there is no inherent improbability in it: while the reconstruction of the theatre so soon after it was made, which Dr. Dörpfeld's theory involves, is inherently improbable. It may be questioned, perhaps, whether either side has really got at the truth about the building, and even whether materials are available for getting any nearer to it.

TWO or three weeks ago we notified the fact (see page 44 *ante*) that the Public Health and Housing Committee of the London County Council, in response to a communication from the Local Government Board, had reported in favour of an alteration in the regulation whereby the London water companies are empowered to restrict the water-closet supply service cisterns in the premises served by them to a discharge of two gallons only, and have recommended that the limit should be altered to three gallons. The only point for comment in regard to such a recommendation is that it should have come so late in the day. The limit of two gallons has been condemned over and over again by sanitary authorities and by the highest class of plumbers as insufficient and insanitary, and many smaller towns than London have long since repudiated such a limit. In spite of this, however, no sooner has the County Council adjourned for the recess than the New River Company, which must be perfectly well aware of the recommendation we have referred to, seizes the opportunity to issue its bulletin of requirements for constant supply to a large portion of its district, and to insert in this again its old requirement that all service cisterns should be reduced to a two-gallon supply. We are informed that even in cases in which tenants have had the sanitary sense (as they may be called) to insert larger supply cisterns, the company are demanding that these should be removed and replaced by the inadequate two-gallon cisterns, which have just been explicitly condemned by the Local Government Board and the London County Council! Although the amended regulation has not yet taken legal shape, we feel sure that the London County Council will not allow the spirit of their decree to be evaded in this manner; and we recommend all house-owners who are served with this notice to refuse compliance with it until a opportunity is afforded to refer the matter to the higher authorities when the County Council re-assembles.

FROM the general consumers' point of view, the coal crisis has at least occurred at a favourable time of the year, but manufacturers, and all dependent upon steam power, will feel the pinch almost as severely now as in the winter. By this time many thousands of workmen will be idle beside the miners, there being so many industries in which nothing can stem the paralytic effect of a fuel famine. The rapidity with which prices have gone up may possibly enable the owners to modify their demands; but any settlement based upon the present exorbitant prices can of course only be tem-

porary; and, moreover, many contracts have yet to run out at the low rates which necessitated the demand for a reduction in wages. The Northumberland coalowners decline to concede any advance, but work is still going on in that county and in Durham, whilst the Welsh miners have passed a resolution emphatically declining to be dragged into any dispute "which would dishonourably terminate the existing agreement between masters and workmen, believing that such a course would be suicidal to our best interests." Nevertheless it is a sad fact that in many of our chief coal-getting centres every pit is idle, and a determined struggle has been entered upon.

SIR HENRY OAKLEY, in giving evidence before the Select Committee on Railway Rates last Friday, remarked that if a company insisted on enforcing the increased rates, he did not think the traders had any remedy. Singularly enough, this was borne out by the result of a test case brought by the North Staffordshire Railway Company in the Leek County Court the very same day. The sum in dispute represented an increase to which the company claimed to be entitled under the new rates; and the judge held that the charge was legal, giving a verdict for the railway company. The amount of increase was not large, but the case clearly indicates that where a company declines to reduce rates which are within the statutory maxima, the judges will not interfere. Most of the larger companies have, for the present, abandoned all rates which were seriously in excess of the old ones; but this has been done as an act of grace—or expediency—and the case quoted affords but little encouragement for the future. Sir Henry Oakley went on to say that he did not assent to the principle that maximum rates were only intended to allow for contingencies. His view was that "they were the rates which the companies were lawfully authorised to charge, and they were entitled to charge them if they thought that was the right way to charge." The companies have doubtless a strong position, but the Committee are in possession of plenty of evidence showing the inconvenience and loss to the public caused by the assertion on the part of the companies of this same power. As to the Great Northern Manager's definition of the principle of maximum rates, it strikes us as being diametrically opposed to the line of argument taken by railway officials when they were seeking Parliamentary sanction for those rates.

A SOMEWHAT notable public building, constructed of concrete, has lately been erected in California. This is the museum building of the Leland Stanford University. The area of ground covered is 300 ft. by 50 ft., and the largest floor spans are 34 ft. The building appears, from illustrations which are given in our American contemporary, *Engineering News*, from which we take these particulars, to be a well-designed structure of Classic architecture. The exterior has a smooth coating of mortar, made up to give the work the appearance and colour of the well-known American brown stone. The chief object of the designer has been to make the building "absolutely fire-proof," and wood is not even used for window-frames. The method of construction is that known as the "Ransome" system, and consists of bonding concrete and iron together, the iron being in the shape of bars or rods of rectangular section, and twisted throughout their length. This metal is embedded in that part of the concrete beam or floor which is subject to tension. The twisting of the bar, it is claimed, considerably increases its tensile strength, and the loss of ductility is not important, as the iron cannot stretch without breaking the concrete. The twisting also gives the concrete a firmer hold upon

the metal, and prevents slipping of the rods in their concrete matrix. In constructing floors on this system, they may be made of an even thickness throughout, but it is advised that they should be panelled, the iron strengthening rods being embedded near the bottom of the ribs. It is said that in this way a light and very strong floor can be built, and a fine effect is obtainable with panel ceiling. The Ransome system of wall-construction—in regard to the method of operation—consists of the use of vertical standards, made in two parts, with a filling piece at each end, so that a slit runs nearly the length of the standard. As the wall is built up these standards may be moved up continuously by removing the filling piece at the lower end.

THE rector and churchwardens of St. Magnus the Martyr have applied to the Consistory Court for a faculty to remove, pursuant to an Order in Council made under 20 and 21 Vict., c. 81, all human remains found in the vaults and beneath the floor. A notable burial in a vault there was that of Miles Coverdale, once rector, to whose memory the parishioners set up (1827) a marble panel against the east wall, that wall being a portion of the old church. Here, too, was buried, in St. Mary's chapel, Henry Yevele, or Zeneley, described by Stow as "freemason," or rather artificer, to Edward III. and his two successors, who shared in the erection of Richard II.'s tomb in the Abbey, and made plans for raising the walls of Westminster Hall. And it is worthy of notice that the bracket clock, projecting from against the western face of the tower, is a successor in both form and place of that which is so clearly depicted in Braun and Hogenburgh's bird's-eye-view of London, done circa 1572. The fabric was repaired and beautified in 1825, when the east window was opened up, and the organ altered by Parsons. The organ, since repaired by Gray & Davison in 1852, and again by Hill, was built by the Jordans in 1712, being the first in London that was fitted with the Venetian swell in lieu of the echo organ; it was a gift of Sir Charles Duncombe. Dr. R. R. Sharpe's researches result in some notices of this church and parish earlier than are commonly recorded. In Part I. of his *Calendar of Wills, Court of Husting, London, 1389-90*, are cited a shop and rents in Bruggestrate, parish of St. Magnus (1274), and rents in St. Magnus parish (1277); under date 1291, the devise by Milo de Oystergate (Ebgate) of his house at Oystergate, in the parish, to his wife for life, together with certain shops and rents at the corners of Oystergate and Breggestrate for maintaining a burning lamp before the great cross in the church; also, under date 1273 a shop towards Viswalf (Fish-wharf), near the eastern end of the church of St. Magnus. Mr. Riley in his "Memorials" (1888) gives an award made by the mayor and aldermen whereby the rector of St. Peter's, Cornhill, is assigned chief place in the Whitsun-Monday procession of the city rectors, over the claims thereto advanced by the rectors of St. Magnus and St. Nicholas Coleabbey (5 Henry V.). The tower, in three stages, is surmounted by a parapet having a plate-tracery balustrade, from which rises an octagonal composite lantern of stone which carries a leaden cupola and small lantern and spire of timber and lead; a composition which in the opinion of many, ranks highest amongst Wren's parish church steeples in London.

THE large consumption of water for domestic purposes in the American cities has frequently been commented upon, and the Americans themselves take some pride in the heavy figures shown by the urban water supply statistics "as indicating a superior civilization of the people of the United States." Some important and interesting figures have been recently published in connexion with the Detroit Water Works. In 1888 the average daily

consumption per head was 204 galls., and, at this rate it was found that the existing water works were not sufficient for the supply of the city. It was therefore proposed that an enlargement of the works should be made, but the Water Commissioners, before proceeding with the work, resolved to try if some saving could not be made by the use of meters. The application was so far successful that in 1892 the total consumption of the city was reduced by nearly 2,000,000,000 galls. compared to that of 1888, in spite of the increase in population, which, in the interval, amounted to 46,000 persons. The saving in expense was about 450/. The daily average consumption fell from 204 galls. to 140 galls. per head. It must not be forgotten that water required for business purposes is to be taken into account, for, at the close of 1892, it is said that "practically all the manufacturing and business houses in the city were supplied through meters": which would lead one to suppose that such was not the case in the first year mentioned—namely, 1888. Our American contemporary, *Engineer*, quotes the fact that the yearly family consumption in London is about 55,000 galls., while in the United States in the town of Providence, Rhode Island, the corresponding figures are 75,000 galls. Mr. Case, the Secretary of the Detroit Water Commissioners, in a report recently issued, states that the figures as to the heavy consumption of water in Detroit supply "but a monument of the ever-growing habit of wastefulness in man." It also appears that the average cost of pumping a million gallons of water at Detroit for the five years previous to 1892 was 4 dols. 45 cts, say, 18s.

THE United States Forestry Division of the Department of Agriculture has been making some experiments in order to ascertain the loss of strength and durability brought about by tapping pine-trees in order to obtain turpentine, &c., from them. It has been generally supposed that the boxing of the tree detracted from the virtues of the timber for constructive purposes, but the investigations of the department tend to negative this view. Both chemical and mechanical tests have been made with the same result as to the non-destructive effect of tapping or "bleeding." Over 300 tests on thirty-two pine-trees from various localities were made; some of these were boxed or "bled" and some were not, and it is a curious fact that the boxed timber showed a better average than that from which the turpentine had been taken. The superiority of the bled timber may, however, be accounted for by the fact that trees which are used for turpentine supply are generally placed in sites more favourably situated for their growth. It is, however, shown by the experiments that the heart of the tree is not affected by the bleeding, the flow of resinous matter being in the exterior sap portion of the trunk. It has long been known that bleeding of the tree retards its growth; and it would appear that this is its only effect in regard to its influence on the quality of the timber. It may be that this checking of the growth has a favourable result on the wood, as tending to the slow growing of the timber.

FROM a paragraph in *L'Architecture* it appears that the *Temps* in France is as clever as the *Times* and other daily papers in England in omitting the architect from the list of people who are to have any credit for a new building. The French journal referred to recently gave an account of the opening of the new "Lycee" at Dijon, by the Minister of Justice, M. Guerin; a crowd of eminent persons were named in the article; all the professors of the academy were crowned with honours; but not a word of the architect. Our contemporary observes, "encore un édifice qui s'est construit tout seul!" As we once suggested to an

eminent physiologist, in reference to a similar account in a scientific journal of the excellent plan and arrangements of a new laboratory in which the architect was ignored in the usual manner, architecture is evidently the last stronghold of spontaneous generation.

BRITISH ARCHÆOLOGICAL ASSOCIATION AT WINCHESTER.

WE now resume and conclude our account of this Congress, which commenced on the 31st ult.*

On Wednesday, the 2nd inst., the members paid a visit to Fareham and Porchester. On arriving at the former town carriages were in attendance which conveyed the party to Titchfield, where the church was inspected and its history narrated by the Rev. R. A. R. White. Its curious appearance, with its nave roof of high pitch cutting into the low shingled spire of the western tower, is not unlike that of a Continental church. The north side has some good perpendicular windows, said by tradition to have been erected by Bishop William of Wykeham, whose birthplace is at no great distance. The belief is likely to be correct, for they are not unlike the good Bishop's work. The tower of the church appears to be of great antiquity, and Mr. Loftus Brock claimed for it a Saxon origin. The plain west doorway, built of large square stones, is certainly in remarkable contrast to the inner doorway, which is a very fine example of moderately early Norman work. The lower part of the tower is built with stones of various descriptions, with bands of Roman brick, the whole appearing, as was suggested, to be the remains of some Roman ruin brought here from elsewhere. But the most noteworthy object is a fine Elizabethan tomb erected by the second Earl of Southampton to commemorate not only himself and his wife, but his father, the first earl, Chancellor Wriothesley, who, having been buried at St. Andrews', Holborn, was reinterred here by his son. The monument is very elaborate, and decorative marbles are largely employed. A visit was then paid to the extensive ruins of Place House, erected in the time of Henry VIII., as the seat of the Wriothesley family. The Tudor House was erected in the midst of the dissolved Titchfield Abbey, which was granted to the Chancellor, and the house erected within a period of four years afterwards.

The monastery was founded in 1231 for Premonstratensian, or White, Canons, and the buildings, of which there are still considerable remains, appear to have been erected very soon after this date.

The mansion was planted on to the church in a curious manner, and the remains were adapted to the purposes of the new building with no little skill. The large entrance gateway, which is flanked by four octagonal turrets, is built across the nave of the church, a large portion of the choir having been converted into suites of dwelling-rooms. The chapter-house was utilised, and the western portion of the nave was divided into two stories, approached from the main gate house. Recent excavations have revealed part of the south transept and the position of the east wall. The piers of a central tower still remain, but the church could never have had a tower of very great elevation, for the piers are too slight. A good ground plan, prepared by Mr. Nesbitt, helped the party to easy knowledge of the various parts of the monastic and the later buildings. The ruins make a fine and imposing group, and surprise was expressed that so important a building has for so long escaped all but a few pencils of sketchers. The whole of the site is but little cared for, although the area of the kitchen gardens is producing a luxuriant crop of market garden vegetables and fruit. The fishponds, which were three in number, can still be traced. There are many interesting historical associations connected with the ruins, over which we may not linger, and it may suffice to say that it was here that King Charles I. was taken prisoner and conveyed to Carlisle.

On the return journey, the town of Fareham was passed through. It looked gay with its telegraph posts, which instead of being left uncared for, have been painted, the bases in black and the stems in Pompeian red, with very good effect, a yellow band dividing the colours.

The party proceeded to Porchester Castle after luncheon, passing through very pretty country, enlivened all the way by a panorama of Portsmouth Harbour, with the town in the distance,

the heavy tower of Porchester Castle being visible for many miles. The Norman Castle is built upon an earthwork mound, which may safely be considered to be of Saxon date. The outer court is formed by the walls of a large Roman station, which extends to the water's edge. The walls are of solid construction and in very good condition, with projecting semicircular towers at the angles and at intervals. It is the most perfect example of a Roman masonry camp that can be found in the South of England. It stands at the end of a small promontory, and may be considered as the precursor of the neighbouring town of Portsmouth. Within the area is an early Norman church, once cruciform, and still so except that the south transept has disappeared. The tower is central, carried by four semicircular arches, with shafts and caps. The Reverend J. E. Vaughan welcomed the party to the church, and related its history. A priory of Austin Canons was founded here by Henry I., but after a time the site was not found to be a congenial one, being in the midst of the garrison, and the establishment was removed to Southwick. Since then, the church has been the parish church of Porchester. Traces of the monastic buildings can be noticed on the south side of the church. The early date of the foundation does not accord well with the apparently late ornamentation of some portions of the work. Mr. Brock solved the difficulty by pointing out that the ornamentation referred to had been done at a later time.

After the return to Winchester a meeting for the reading of papers was held at the Guildhall, Mr. T. F. Kirby, F.S.A., Bursar of Winchester College, being in the chair. An interesting paper was read by Mr. A. Wyon, F.S.A., Treasurer of the Association, on the "Seals of the Bishops of Winchester." Representative examples of the whole series were exhibited, showing many curious variations of costume and design. A series of casts of the Seals of Bishop William of Wykeham were exhibited by the Master of New College, Oxford, and several more, attached to original deeds, were shown by the chairman. A second paper was afterwards read by Dr. Phené, F.S.A., on the "Tumuli of Hampshire," a county which abounds in examples of the burial places of its early inhabitants.

On Thursday, the 3rd inst., the archaeologists were out at an early hour and on their way to Romsey Abbey, under the guidance of Mr. Loftus Brock. The present vicar, the Rev. Mr. Yarborough, welcomed them to the fine old church, and they proceeded to the nave to listen to an address by the Rev. E. L. Berthon, who had been vicar for many years. He described the alterations and other works which had been accomplished by him, the greater part of which had been very praiseworthy and to the real benefit of the structure, such as the sweeping away of the former galleries, the providing of a central passage, and others of a similar description. The party listened with interest to his assurance that, had he the work to do once again, he would not repeat the obliteration of part of the north side of the nave, where formerly had been the parish church. Here some of the bays had been recast in the Norman style, similar to what it may have been originally. The parishioners having had disputes with the nuns on, apparently, being deprived of entrance to the nave, William of Wykeham erected an outer aisle for them, a portion of the north transept having also been screened off for their use. Portions of this screen had been recovered and refixed. Mr. Loftus Brock described the architecture of the church, pointing out the peculiar features, and assigning a moderately early Norman date to the oldest parts, the work of rebuilding the previous Saxon church having begun at the east and slowly carried on to the west, the west front and a large part of the nave being of Early English work. Owing to the elaboration of the ornamentation on the earliest parts, a late Norman date has often been assigned to the work, but this is owing to the fact that the carving has been executed on earlier Norman masonry. Some few of the capitals are of original work, and are very archaic in their forms, in good contrast to the later ones, the name of the sculptor, Robertus, appearing on one of them. The Rev. G. N. Godwin related many incidents which occurred at Romsey during the Civil Wars, and the bullet marks, which still remain on the north side of the church, indicate to this day a skirmish in the churchyard. Some few remains of the nunneries buildings remain in the modern houses on the south side, but an archway which led into them has been removed of recent years. The time allotted to the visit proved to be much too short for the inspection of such an important

building as this, and many of the visitors left with regret, although the first rain that had been experienced during the proceedings began to fall.

After luncheon at Winchester, the party re-assembled at the hall of Winchester Castle, once the great hall of the demolished building. It now serves as an adjunct to the Assize Buildings, the eastern end having been recently removed to afford better access to them, when the celebrated King Arthur's Round Table was taken down and rehung against the western wall. It is a fine apartment, divided by two rows of columns and arches into nave and side aisles. The Rev. Mr. Godwin related the history of the building and many of the important historical events that had taken place within its walls or in those of its Norman predecessor, from the days of William the Conqueror to recent times. The present fabric is of Early English work, rather much restored, but traces of some curious dormers, found during the restoration, have been opened out to view. The castle was dismantled at the close of the Civil Wars, and afterwards the site was sold to King Charles II., who proceeded to erect here an enormous palace from the designs of Sir Christopher Wren. Its shell only was completed, and this now serves their purposes of barracks. The archaeologists were able to trace the foundations of portions of the massive walls of the castle, which bore witness to the extent and strength of the demolished works. Afterwards they proceeded to perambulate the city, and to inspect some of the many ancient buildings which still exist. Close to the fine old cross, in the High-street, a crypt was visited beneath the establishment of Messrs. Dyer. It is square in plan, with a massive brick pier, octagonal in form, from which spring ribs of the same material of very depressed four-centred form, which radiate to the angles and with intermediate ribs to each side, those to the angles being very much depressed. It is a curious piece of construction. Close at hand is the block of very early timber-built houses, known as God Begot House, which form a manor of themselves, opposite, or nearly so, is the town church of St. Lawrence, whence the Curfew is still rung every night at 8 p.m., and the bell of which is tolled by each bishop on being inducted. Instead, it is supposed, of doing homage to the King, the Conqueror's palace having stood on an adjacent site. The curious Church of St. John was next visited. It contains a capital Geometrical tracery window, and is a curiously irregular specimen of planning; the aisles are continuous with the chancel and nave, and the plan is nearly a square. The site of Hyde Abbey was next visited, and although the buildings were once of very large extent, the present remains are very scanty. Hyde Church, close at hand, was inspected, and the Rev. Canon Humbert described the principal features of the building. In the porch, Mr. Park Harrison pointed out a capital of early form, which may be of Saxon date, removed from elsewhere.

At the evening meeting at the Guildhall, the chair was taken by Mr. Kirby, and papers were read. The first was by Mr. Alderman Jacob, on "The Plague at Winchester." More plaques than one were dwelt upon, but the principal visitation treated of was the severe scourge of 1665-66. These were not to be wondered at, for the paper, which shed much light upon the social condition of our towns during the "happy" Middle Ages, so-called by many, revealed a state of things which the lecturer described as being an entire absence of all sanitary rules. Mr. Ronilly Allen, F.S.A. (Scott.), had sent a paper on the "Cathedral Font," which treated of various similar works, and with a tabulation of the subjects represented upon all of them. It was read by deputy. A third paper was on the recent discovery of a Saxon burial place, close to the town of Reading, prepared by Dr. Stevens. The articles found, which attest an early Saxon date, are now preserved in the Reading Museum.

On Friday, the 4th inst., at a very early hour, the company departed for Southampton. There were there escorted by Mr. J. W. Shore, an antiquary well-known as the secretary of the Field Club of the County, to the ancient Bar Gate, and the curious additions of late fourteenth-century work to the earlier Norman gate were pointed out. The history of the building was related in the chamber above. A fine Norman vault, once part of the demolished Southampton Castle, was next inspected. It is deprived of its broad flat ribs, which once were spaced along the barrel vault, but the corbels remain. Close at hand are portions of a postern from the castle, recently put in order by the Corporation and a descriptive tablet erected. Elsewhere in the

* For an account of the proceedings of the first two days of the Congress, see last week's *Builder*.

town similar tablets have been placed descriptive of the old buildings, the interest of which is much enhanced thereby. Other corporations may with advantage follow this example. A large portion of the City walls were next inspected, together with the curious Norman house known as King John's Palace. Certain works of repair have been effected here in a very judicious manner. The town wall in front of the palace has some curious outer arches which were erected to strengthen the wall for defence after the attack of the French in 1337, when the town was taken and pillaged. A visit was then paid to the Church of St. Michael, the oldest in the town. Here one of the black marble forts, similar to that at Winchester, was inspected. There are also some curious monuments, but the architectural features of the building are not elaborate. The tower occupies a central position, and it is carried by four semi-circular arches without column, impost, or moulding. Mr. Loftus Brock pointed out that the stones had none of the usual diagonal tool marks which distinguish Norman masonry. On the contrary, they were covered with a scabbled dressing of different form, and the stones were large and more nearly of square shape than was apparent in the Early Norman masonry that had been seen elsewhere. He suggested a Saxon date for the arches, and contrasted them with the Early Norman arches which support the central tower of Porchester Church, the latter being of very different work. The party then proceeded to the Municipal Buildings, where they received a hearty welcome from the Mayor, on behalf of the Corporation. The town regalia, the sword, and various ancient documents were laid out for inspection. Mr. Wyon, in returning thanks to the Mayor, expressed gratification at the proposal now being discussed in the town, to preserve the old Bar gate by forming crescent approaches to it on each side, so that the increasing traffic may go around it rather than under it. The Mayor rejoined that this was a large undertaking, which would require a large expenditure, and it was unknown how it would be taken up by the town. But, at any rate, the ancient Bar was in no danger at present of being removed as an obstruction. On leaving, more of the city walls were inspected; then the site of the great house of the Earls of Southampton, burnt about 800 years ago; after that, the site of St. Barbara's tower, the ancient weigh-house, the old building called the palace of King Canute; and, finally, the Chapel of St. Julian, attached to the Maison Dieu, now used as the Church of the French Protestants.

Luncheon having been partaken of, the party proceeded by carriages across the ferry, and along the course of Southampton Water to the beautiful ruins of Netley Abbey. The Rev. Mr. Minns was present, and he gave an interesting history of the building, pointing out the various portions by the aid of plans and engravings. Mr. Lynam described the architectural features and the arrangements of a Cistercian monastery. The general plan is fairly traceable here, but the domestic portions are somewhat obscured, owing to the conversion of the Abbey into a mansion after the Dissolution. The ruins are fairly well kept, but attention is necessary in several places to prevent dilapidation. Progress was then made to Bittern Manor, on the invitation of Sir Stewart and Lady Macnaghten, to inspect the remains of the old Roman station of Clausentum, which occupied the same relative position to Southampton as does the station at Porchester to the modern town of Portsmouth. But Clausentum has been so completely demolished that its site was unknown for many years. Sir Stewart led his guests to the drawing-room on the first floor, where all the objects found in the excavations, which were effected a few years ago, were laid out for inspection. Many fine fragments of Samian ware, and two curious lamps or candlesticks were among the objects found. Certain of the inscribed stones had been found built up in the Roman walls as disused material, and some of these were cut in Quarr Abbey stone, showing that these celebrated quarries were known and worked by the Romans.

In the evening the Dean of Winchester presided at the meeting for the reading of papers. The first paper was by the Rev. R. H. Clutterbuck, F.S.A., on the "Black Book of Southampton," one of the manuscripts which had been seen in the morning. It was followed by another, also by Mr. Clutterbuck, on the Records of the "Town of Andover." The third paper, by Mr. N. H. Nisbet, was on the "Churches of the Manor of Chilcomb." Nine churches are recorded in the Domesday Survey as then existing, and seven or eight can now be identified

with tolerable certainty. They are, for the most part, early Norman buildings of small size.

Saturday, August 5, the last day of the meeting, was devoted to a visit to Old Basing House. Many of the members were surprised to find here the remains of an enormous earthwork, which, from its appearance, and its relation to other works in the district or within sight, could hardly be anything else but of ancient British date. A castle of Mediaeval times is known to have existed here, but the masonry works appear to have been all swept away to clear the site for the erection of a huge mansion by the Earl of Winchester at the close of the first half of the sixteenth century. There is extant an etching, said to be by Hollar, but more probably by Faithorne, which shows the condition of the buildings after the great siege of the house during the progress of the Civil War. They appear by the existing remains to have been of brick, with stone dressings, and by the view to have been of great extent. On arrival, the party proceeded, under the guidance of Mr. Godwin, through the entrance gateway, a building of small size, and doubtless only a secondary way of approach into the outer works of the house, where a dovecot and a tower still remain. Elsewhere, outside the site of the house, is a large barn, of brick, with a capital open timber roof in good preservation. It is called the riding school. On ascending the high banks which mark the site of the house, the party found themselves within a large circular area, surrounded by a deep ditch and an earthen rampart, upon which were traces here and there of a red brick wall. Within, many remains have been laid bare of brick-built vaults which had been covered by four-centred arches, now broken. Around the area was a narrow-covered way of doubtful use; but the banks had been supported by a good amount of modern walling, formed of the old brickwork, removed from elsewhere, which at first is confusing. It was built when the circular area was turned into a bowling-green. Here Mr. Godwin gave a graphic description of the early events of the Civil War in relation to Basing House; of its gallant defence for a long period, until it was reduced by Oliver Cromwell in 1645. During the assault the mansion caught fire, and the ruins were afterwards at the disposal of anyone who wanted old materials. Adjoining the site of the house is the Church of Old Basing, a building of considerable size, but which, having been held alternately by the Royalists and by the Parliamentarians, suffered very severely during the siege. The tower had to be rebuilt in brick, and various other works of repair had to be carried out. Much of the church, however, appears to be of the same age as the house, and is erected of red brick. The windows are for the most part of good Perpendicular date, but those of the north chapel of the chancel are constructed of hard wood, said to be walnut. They are of capital design, and, although erected early in the sixteenth century, are in very fair preservation.

On returning to Basingstoke, the regalia of the town was laid out for inspection in the Town Hall, and, after inspecting it, a visit was made to the Parish Church, a large and lofty building, erected by Bishop Fox in the early part of the sixteenth century, the windows having a curious pattern of small parts, not very pleasing. The roofs are ancient and good, especially that of the Chancel, which is of earlier date. The ruins of the Chapel of the Holy Trinity, now in the modern cemetery, were next visited. They are of elegant Perpendicular design, and were formerly attached to the larger Chapel of the Holy Ghost, which has all but completely disappeared, a part of the west wall alone remaining.

The visitors returned to Winchester by an early train, and the closing meeting of the Congress was held in the evening in the Council-chamber of the Guildhall, for the reading of papers, the Rev. S. M. Mayhew being in the chair. We conclude our notice of the Congress by stating the titles of these papers:—"The Civil Wars in Hampshire," by Mr. W. Money; "Skull Goblets," by Mr. Henry Syer Cuming, F.S.A. (Scot.); "Prehistoric Flint Implements found near Chichester," by Mr. W. Haydon; "Some Discoveries in Winchester Cathedral," by Mr. Park Harrison—(the author claimed for the usual Norman cushion capitals an origin in England prior to their use in Normandy, and quoted Mons. Bouet that they are not found at an early date in Norman works in Normandy); "The Diocese of Winchester and the Channel Islands," by Mr. S. W. Kershaw, F.S.A., of Lambeth Palace Library; "The Priory at Hamble," by Mr. B. D. Cancellor.

The Congress has been a successful meeting, being well attended, and the party had the benefit of very fine and enjoyable weather.

NATIONAL ASSOCIATION OF MASTER BUILDERS OF GREAT BRITAIN.

THIS Association held its half-yearly meeting at the "George Hotel," Huddersfield, on the 2nd inst. Mr. Robt. Dennett, of Nottingham, the President, presided, and representatives were present from London, Manchester, Liverpool, Birmingham, Bristol, Southampton, Salford, Leeds, Bradford, Leicester, Derby, Bolton, Huddersfield, Hanley, Slough, Colcar, Preston, Potteries and Newcastle, Crosland Moor, Blackburn, and Lockwood.

The report and accounts as submitted by the Council, for the past half-year, were adopted and ordered to be printed and circulated.

After carefully considering the action taken by Mr. Tenperton, the Association fully endorsed what he had done, and promised to give its utmost support in the matter.

The question of the Employers' Liability Bill, as amended by the Standing Committee on Law, was discussed, and it was considered that it would be very prejudicial to the employers in the Building Trades if there was no time fixed for bringing an action, as the workmen in the Building Trade are of a very migratory class, and might be scattered far and wide when they might be wanted as witnesses.

The Council strongly recommended that all the master builders connected with this Association should insure their risks under the Employers' Liability Act and Common Law, in the Builders' Accident Insurance, Limited.

It was resolved that a scheme be formulated for strengthening the Association, by bringing in every town in the country.

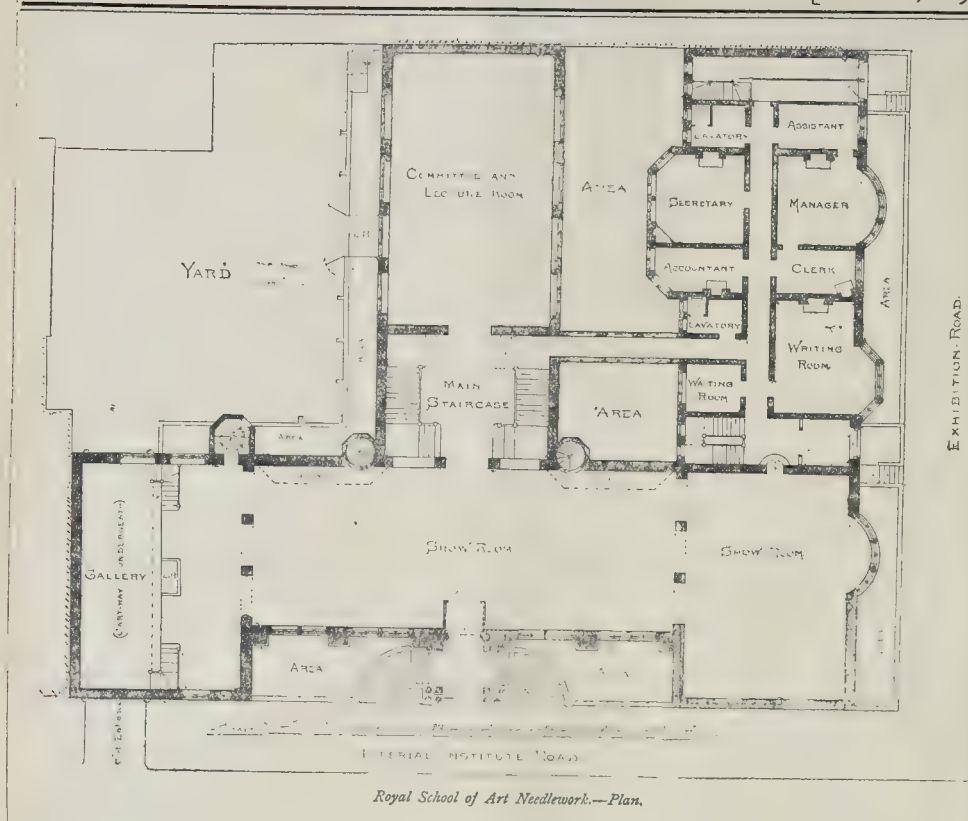
A hearty vote of thanks was accorded to the President and officers for their services during the past half-year, and upon the conclusion of the meeting Mr. Jessop, the President, and the members of the Huddersfield Master Builders' Association, entertained the representatives present, and afterwards conducted them to view the various works of interest in the locality.

COMPETITIONS.

BATHS, LEEDS.—At the meeting of the Leeds City Council on the 2nd inst., Alderman Henry (Chairman of the Baths and Wash-houses Committee) moved that the designs of Mr. Walter Hanstock, architect, of Batley, be accepted for the baths proposed to be erected in Union-street and Kirkstall-road. In the instructions to architects it was stated that the Committee were in favour of the system adopted at the Batley Baths, and in the discussion which took place it was pointed out that the successful architect had revealed his identity by the *nom de plume* he had adopted, and complaint was made that architects could not get admission to the Batley Baths. The matter was referred back to the Committee for further consideration. In the meantime, some of the thirty-nine architects who had sent in plans wrote asking them to be returned, and at a meeting of the Committee held on the 4th inst. it was resolved to communicate with the architects requesting them to leave their plans, as the matter was to be further considered. The Committee will meet again on the 22nd inst.—*Leeds Mercury*.

BUILDERS' EXCHANGE CLUB, LEEDS.—The Mayor of Leeds (Alderman Ward) opened on the 1st inst. the new premises at 19, Boar-lane, which the Leeds Builders' Exchange Club have recently acquired. Councillor Hannam, Vice-President of the club, explained that the object of their organisation was to further the building trade, and organisation was to protect each other's interests as far as possible. It was formed in April, 1889, and consisted at first of twenty-six members. A year later the membership had increased to thirty-nine, and this number was continually being added to until it stood at ninety-eight. They then determined to find premises of their own. In furnishing those rooms they had spent 270*l.*, and to meet that and other expenditure they had floated a company with a capital of 1,000*l.*, divided into 1,000 *1*l.** shares. Over 500 of the shares had been taken up. There were now 150 members.

THE PUBLIC LIBRARY AT WALTHAMSTOW.—The Local Government Board having approved the site for a Public Library at Walthamstow, the Local Board have decided to proceed at once with the new buildings. Mr. J. Williams Dunford, Queen Victoria-street, E.C., has been instructed to prepare the necessary plans in conjunction with a committee of the Board.



Royal School of Art Needlework.—Plan.

Illustrations.

THE ROYAL SCHOOL OF ART NEEDLEWORK.

THIS institution has for many years occupied temporary premises in part of the old Exhibition-buildings, facing Exhibition-road, but a fine site for the permanent building has now been obtained at the corner of the Imperial Institute-road in the position lately occupied by the Indian Museum. The new buildings will comprise four stories. The basement and ground floor will be devoted principally to show-rooms, committee-rooms, and offices of the staff; the first floor to work-rooms, classrooms, more offices, and an Exhibition room. On the top floor there will be a large dining-room, kitchen, &c., for the benefit of the staff and workers, and also a considerable number of bed-rooms and sitting-rooms to be let to members of the staff.

The materials proposed for the exterior are red sand brick, Portland stone, and green slates.

H. R. H. Princess Christian is President of the School, and has devoted a large portion of her time during the last twenty years to active work in its interests.

It may be useful to architects to know that they can have their designs for any kind of art needlework carried out by the School at estimated cost.

ENTRANCE, ASHBY FOLVILLE MANOR.

THE accompanying illustration, which is from a drawing exhibited at the Royal Academy, shows a portion of the work now in progress for the restoration and extension of the old Manor House, at Ashby Folville, near Melton Mowbray, the property of Mr. H. H. Smith Cavington.

During the last century, according to local tradition, a considerable portion of the house was destroyed by fire, and that such actually was the case has been proved by the charred state of the

roof timbers, &c., at the south end of the building. Previous to this fire, the general plan, as shown by an ancient map of the estate, comprised a central block with north and south wings, an arrangement which has been followed in designing the present extensions, with the addition of a kitchen block and servants' wing to the east of the original buildings.

The work is being carried out by Mr. H. H. Sherwin, of Waddesdon, near Aylesbury, Mr. Lancefield being the clerk of works.

The architect for the building and for various other works on the estate is Mr. John Ely, F.R.I.B.A., of Manchester.

THE IMPERIAL BANK, PECKHAM BRANCH:

CARVED BRICK PANEL AND FRIEZE.

THIS, the chief branch of the Imperial Bank on the south side of the Thames, is situated in the open part of the High-street at Peckham.

The site has but a very small frontage, and this the architect utilised for a large Renaissance porch, nearly square externally but circular internally, and surmounted by a stone dome pierced with eyelets, the total height above the pavement being over 26 ft. The entrance is a lofty semi-circular opening flanked by columns of almost black Norwegian granite. The rest of the porch and all the dressings of the building are Portland stone. The entablature has a blocking-course, on which, over the columns, are two vases, and in the centre is a dormer containing an illuminated clock. The dome is finished with an Imperial crown. The internal walls of porch are finished in red Scagliola and the floor is in marble mosaic. A corridor, 9 ft. wide, divided into bays by pilasters and semi-circular arches, with pierced and decorated spandrels and panelled soffits, leads to the manager's residence and bank offices. The corridor has a mahogany-panelled dado, 8 ft. high, of deep Chippendale colour. It is lighted by panelled skylights in the bays. The banking-room is a large apartment, 50 ft. long, divided into five bays by pilasters, from which spring elliptical principals with hammer beams and carved

pendants supporting a lantern light, 14 ft. wide, the whole length of the room. Beneath the light the plaster ceiling follows the elliptical course.

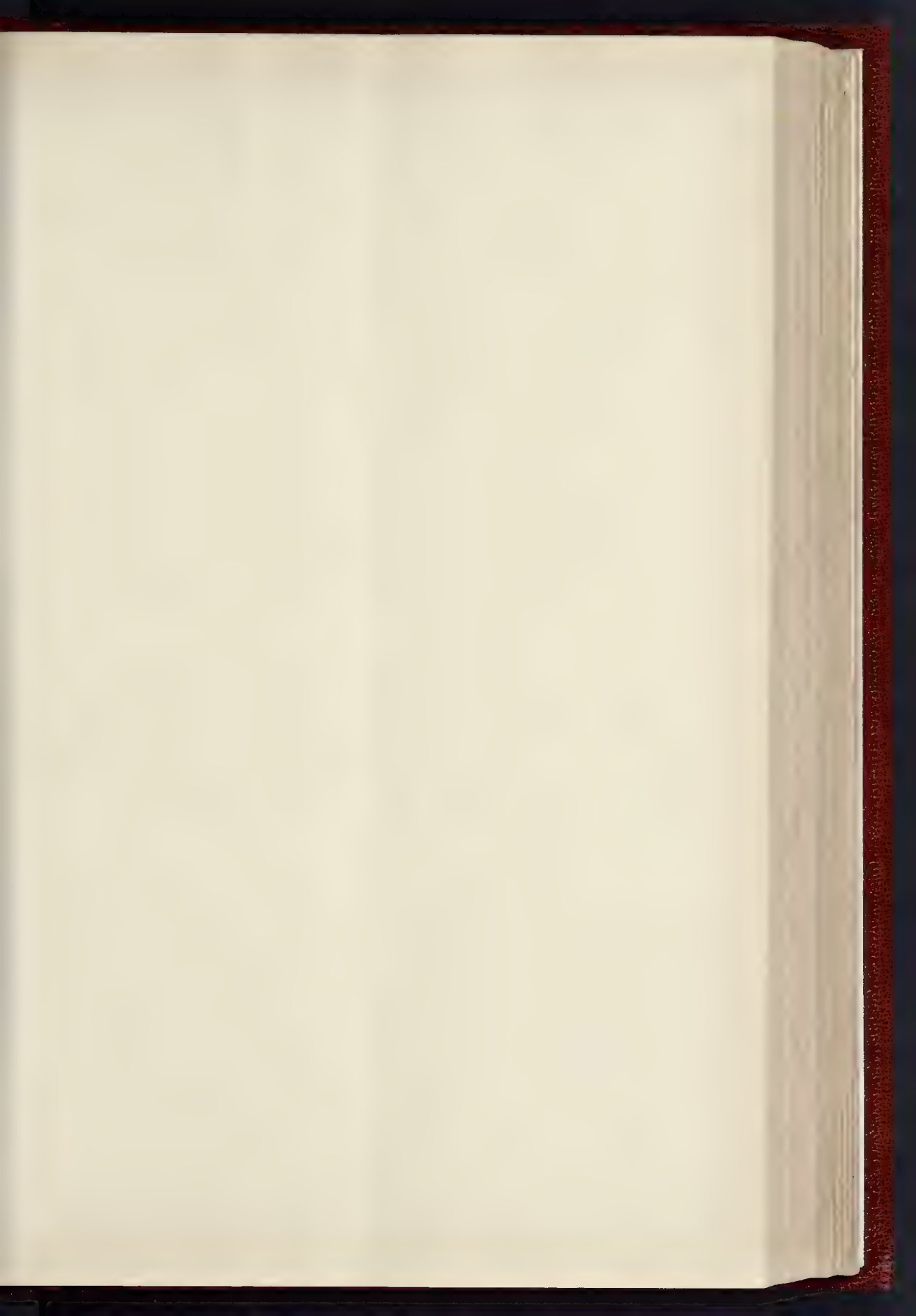
At the extreme end, facing the entrance, the centre of the gable is decorated by the large bas-relief, shown in our illustration, carved in red gauged brickwork. This is an allegorical representation of the Imperial Bank. The central figure is Empire, with the attributes of Justice, not blind and passive, but awake and active. Her supporters are recumbent figures, Truth and Fidelity on the one hand, Strength and Security on the other, and her sway over land and sea is depicted by figures on either side. All these are life-size.

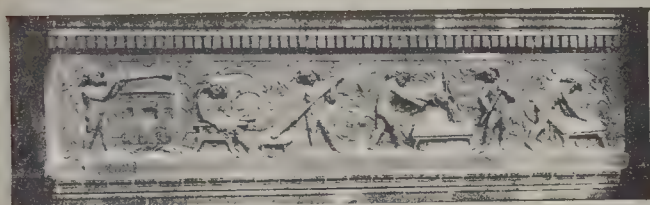
Beneath the springing of the roof, and at the entrance end, is a similarly carved frieze 125 ft. long, illustrative of the various occupations which render banking a necessity. Of these we illustrate nine bays. Continuity and rhythm are maintained by a flowing scroll through all. It is believed that for an internal decoration of a non-public building this is the first time in London that a frieze of this description has been employed. All the photographs from which our illustrations are made are, of course, taken from the work *in situ*, and it will be seen that the mode of lighting the room is well adapted to the carving. The walls beneath are panelled with a high mahogany dado, and all the fittings are of the same dark wood. All floors are of polished oak.

The contractor for the building was Mr. Geo. Parker, of Peckham. The modelling and carving were done by Mr. Gilbert Seale, and the work was designed by and carried out under the supervision of Mr. Edwin T. Hall, F.R.I.B.A.

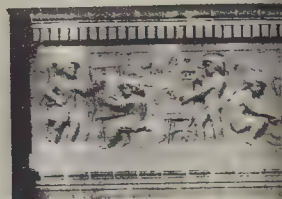
LODGES, SPRINGHILL, WORCESTER-SHIRE.

ONLY the half-timbered lodge is at present erected. It is built of local stone in the lower story and oak and plaster in the upper, left the natural colour. The roof is covered with Gloucestershire stone slates, and the chimneys are of red brick.

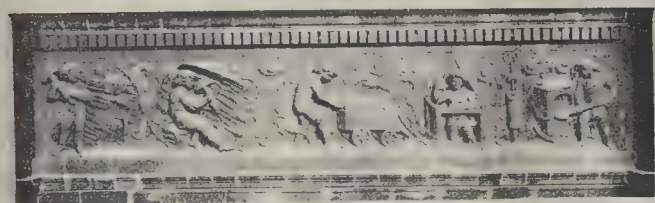




Glass Making.



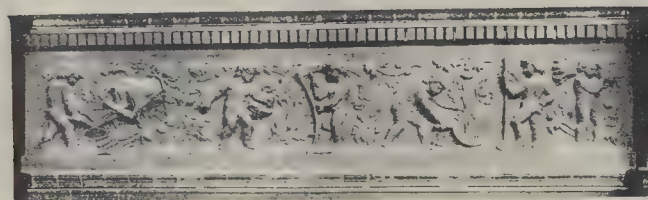
Engineering.



Coal Mining.



The Sea
Trade & Fleet
The



Agriculture.

THE IMPERIAL
PEOPLE
Cursed brick

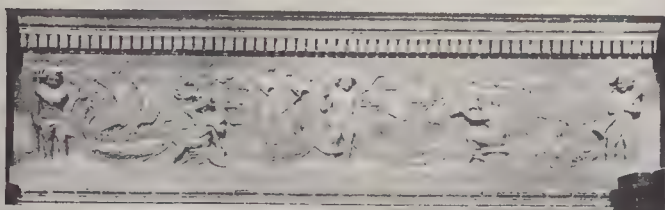


Domestic



Domestic

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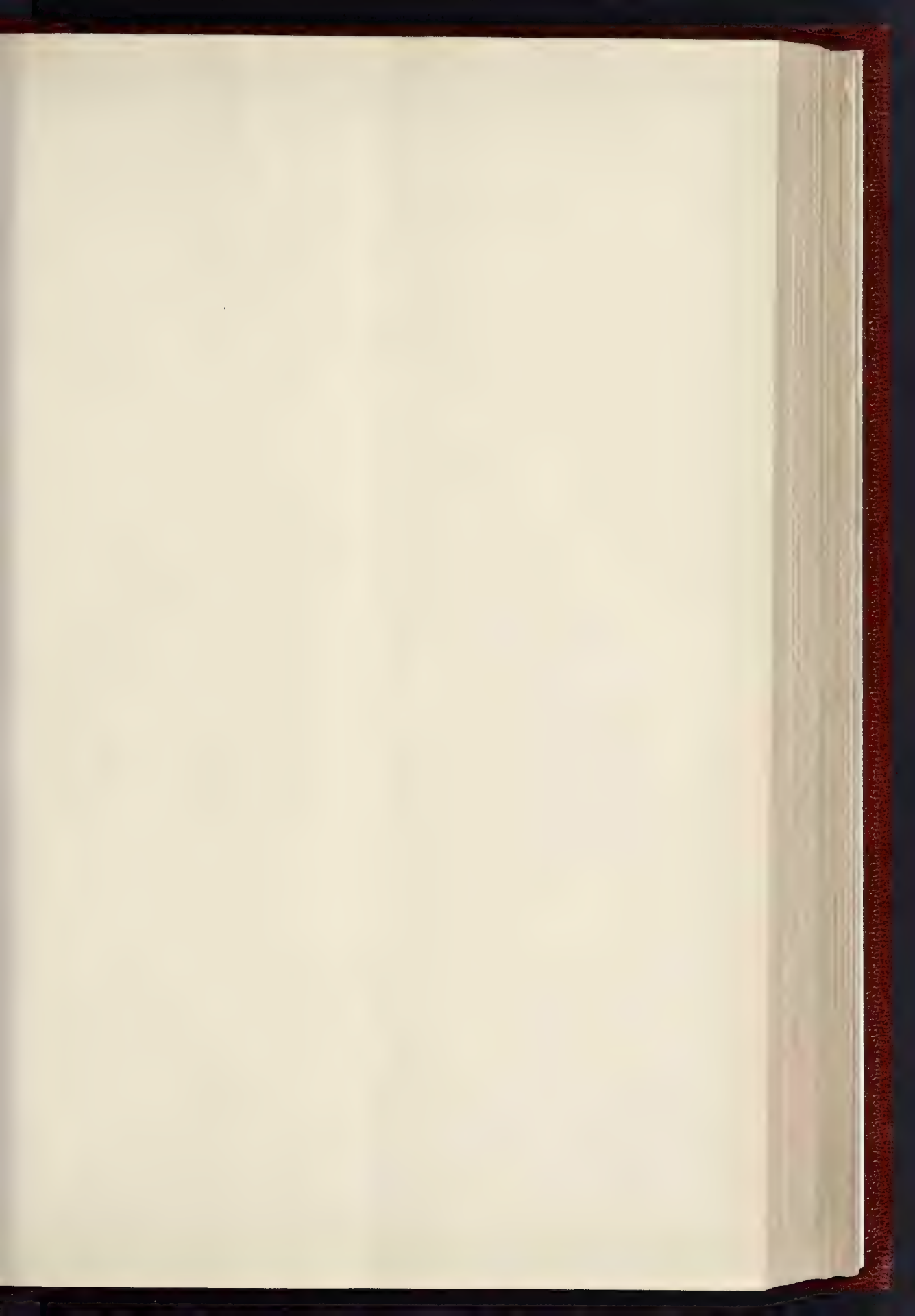


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LIMITED
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The Bank



Commerce



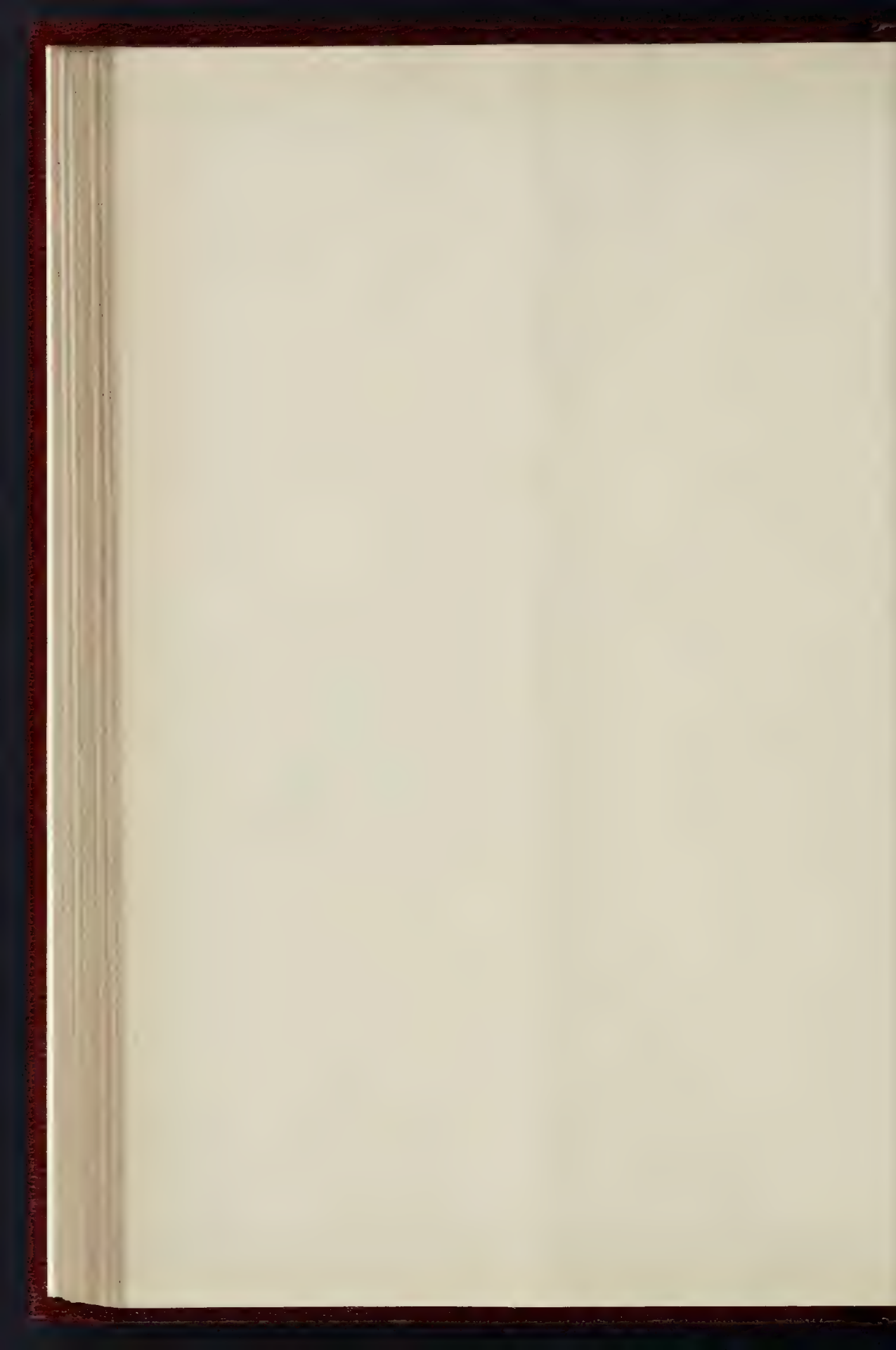
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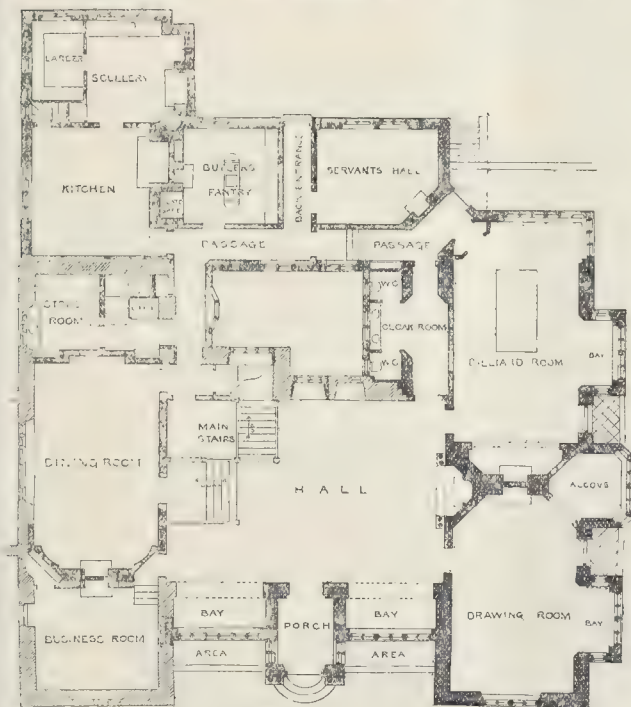


E.G.D. del. 1892





FIRST FLOOR PLAN



GROUND FLOOR PLAN

OLD WALLS REUSLO ARE SHOWN 1773

Ashby Folville Manor, Leicestershire,—Plans.

It was thought desirable, owing to its position, and background of a dense wood, to introduce the half-timber treatment.

The builder was Mr. Alfred Groves, of Milton-under-Wychwood, and Mr. E. Guy Dawber, of London, was the architect.

MAGAZINES AND REVIEWS.*

The *Art Journal* includes two architectural articles, one by Mr. Whitworth Wallis on "The City of the Golden Shell"—Palermo to wit, with some illustrations of the Cathedral, and one by Miss Delia M. Hart, on the "Royal Palace at Madrid," accompanied by illustrations both of the building as a whole and of some of the apartments and decorations. An article on the "Woman's Building at the Chicago Exhibition," by Mrs. Fenwick Miller, deals mainly with painted decorations, and omits any notice of the sculpture decoration by two lady artists not unknown in England—Miss Rope and Miss Halle. Mr. C. R. Ashbee contributes an article on "Jewellery, and How to Wear it." He examines the modern English lady's notion of jewellery, as "a fashionable adjunct," "a commercial article and scarcely ever a work of art," is unhappily only too true. The article deals mainly with Cinquecento taste and design in jewellery.

The *Magazine of Art* contains a criticism by Mr. Claude Phillips on the Paris Salon, with which we are very much in agreement, and an article by Mr. Spielmann on the work of Mr. Linley Sambourne, accompanied by reproductions of some characteristic and unpublished early pencil sketches of Mr. Sambourne's. Mr. Herkomer's paper on Mr. North and his method of working is of much greater interest than either of these, and contains some very suggestive remarks in regard to various methods of water-colour painting. No one who knows the pictures of F. Walker and of Mr. North would be surprised to find that they were close allies and worked toward a great goal, but the other interesting feature of Mr. Walker's paper is that he has adopted Mr. North's method and feeling in landscape, while the latter was not influenced by Walker. However, the fact was that Walker's figures were the ultimate object of his paintings; the landscape was only the harmonious setting.

"The Studio is a very interesting number. "Artistic Gardens in Japan," by Mr. Charles Holme, is accompanied by a number of Japanese sketches, and a view of an actual Japanese garden, which is not much like any of the sketches. An article on the Leek Embroidery Society, by Mr. Kinton Parkes, gives some charming illustrations of embroidery design. There are a considerable number of short articles on a great variety of subjects, mostly characterised by piquant and suggestive criticism.

appears eight times a year at intervals not warranted to be regular (after the manner of some French publications) commences, in No. 2 of Vol. II., just out, an essay by Mr. H. Langford Warren on the "Use and Abuse of Precedent in Architectural Design," which takes a wide and thoughtful view of this difficult subject. The illustrations include two large line elevations, beautifully drawn, of the façade of a music-hall at Baltimore, by Messrs. Griffin & Randall, and a house front by Messrs. Carrère & Hastings. These are works in a pure and refined classic style, without much originality, but carried out with great refinement. A perspective view and section of the music-hall are also given, but no plan. The hall shows a semicircular Classic façade towards its principal side, with an order of coupled columns supporting a complicated openwork of scrolls and scrolls, and the section this portion appears to be a large *foyer*, from the music-hall being in the rear, and treated externally with a plainness which is in rather too marked contrast with the architecture of the front portion; perhaps it is not in reality seen so much as it appears in this view. We have to thank the *Architectural Review* for some very cordial remarks in regard to this journal, & *propos* of our Jubilee Number of January last.

The *Architectural Record* is a good number, and appears this time to be all original and nothing "conveyed." Mr. Barr Ferree contributes the third of a series of articles on French

* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

Cathedrals; Mr. Montgomery Schuyler writes on the State Buildings at the Chicago Exhibition, which he thinks would have had a better combined result if the architects had gone to work after consultation with each other and on a definite plan, as the architects concerned with the other buildings of the Exhibition to some extent did. M. Henri Rauline contributes an article, with illustrations, on the Church of the Sacred Heart at Montmartre.

The *Quarterly Review* includes a very interesting article on "Bookbinding," a short summary of the history of the art. The author of the article touches in conclusion on the theory recently set up by some enthusiastic bookbinding artists, that the binding should be symbolical of the book, and questions—and we think not without reason—whether such an idea can really be carried out on any principle. If, he observes, we take some choice example of richly-decorated work from the best days of bookbinding, and obliterate the title, we shall find it easy to mention many hundreds of works, of entirely diverse character, which might be encased in such a cover without even the suggestion of inappropriateness or "want of taste." That seems to be the common sense of the matter. All that can really be carried out is some general accordance between the type of book and the type of binding; a rich and fanciful design for a rich and fanciful poem; a plain and practical looking design for a practical work. Further than that we can hardly go.

Scribner deals with no specially artistic subject this month, but is as well illustrated as usual.

The *Century* includes the continuation of M. La Farge's "Artist's Letters from Japan," in which he gives a striking account of the impression made on him by the colossal statue of Buddha at Kakumura, and the peculiar style of the modelling, which gives it, he says, the true impression of a colossal—"not a little thing made big, like our modern colossal statues; it has always been big, and would be so if reduced to life-size." This is followed by a short article on "Contemporary Japanese Art" by Mr. E. F. Fenelosa, with illustrations from the Japanese exhibits at Chicago, including a wonderfully spirited head of a tigress by Kishi Chikudo, in which the whole ferocity of tigerdom seems summed up. But the most interesting things in the number are the reproductions from some of the etchings of "a Swedish etcher," Anders Dorn, which, even as reproductions, are splendidly bold in the effect and modelling produced by line; the portrait of a lady, "Olga B.," is masterly, and in the figure called "The Toast" is to be noticed, as a small but remarkable bit of detail, showing the power of the artist over his method, the manner in which the glass held in the hand is indicated; it is apparently as slight as possible, but conveys the effect completely.

In *Harper's Magazine*, Mr. Platt continues his article on "Italian gardens," illustrated from photographs specially taken. Some of these, notably "The Garden Wall at Caprarola," are ready-made pictures, which require no rearrangement at the hand of the artist. A very interesting and well-illustrated article on "Greenwich Village" gives a description not of the historic London suburb of that name, but of an old-fashioned quarter of New York which seems to have retained its individuality. Some of the sketches might very well pass for bits of Old London.

In *Longman's Magazine*, Mr. Austin Dobson collects together the topographical description of towns and other sites in England and Wales to be found in "Humphrey Clinker," with a result which is interesting as indicating the aspect and condition of some English towns in the days of Smollett, for the descriptions are evidently intended to be realistic.

Blackwood contains a short article by Lady Stafford Northcote, "Among French Cathedrals," a record of the impression made on an accomplished amateur mind by various well-known cathedrals, and with a very amateurish touch in the mention of the "contempt for all modern buildings" with which the party pursued its way; architecture being ordinarily divided by the aesthetic traveller of the day, not into "good and bad," but into "old and new," all the latter being assumed to be bad, even if all the former are not good (Lady Northcote is discriminating about Beauvais). The remark was made in Paris, where it may certainly be said that some of the modern buildings are worth a good deal more than most of the ancient ones.

The *Nineteenth Century* includes a short

practical article by Lord Meath on "Public Playgrounds for Children." Lord Meath, while admitting that the public parks do a great deal in providing open spaces for the poorer classes, wishes to see a boys' and girls' playground (divided) fitted with gymnastic apparatus and appliances for suitable games, maintained by the municipal authority in every large city, within a quarter of a mile's walk of each working or middle-class home. The writer describes one constructed for the tenants on his property in Dublin. The idea is an excellent one, but the securing of the necessary sites in London must be a work both of time and money. Once secured, the formation and maintenance of the playgrounds ought not to be too heavy a tax on the rates in consideration of the importance of the object. Prince Krapotkin's article on "Recent Science" in the same number is a useful summary of some of the recent teachings of science.

The *Atlantic Monthly* contains a thoughtful article by Mr. N. S. Shaler, on "The Relations of Academic and Technical Instruction," the main point of which is to urge that the technical instruction may with advantage be linked with the academical as part of a University training, instead of being relegated to a separate institution; the contrary idea being referred to as English and antiquated. The writer considers that a University may fully include every kind of training which is to fit the student to make the most of his life. The article is worth the attention of those who are interested in the technical education problem.

The *Newbury House Magazine* contains a charmingly-written little article by E. M. Green, with a few sketches, on "Adel Church and its History," and one by E. E. Kitton, on "Crowland in the Fens," also partly archaeological. Mr. H. J. Feasey contributes a pleasantly-written article, under the title "A Gossip on Church Bells."

The *Gentleman's Magazine* contains an article by Mr. J. Ellard Gore, F.R.A.S., on "The Barometric Measurement of Heights," which may be very useful in giving to non-scientific readers a distinct idea of the manner in which heights are obtained by the reading of the barometer. Mr. Percy Fitzgerald contributes a most interesting article on "Rambles in Johnson Land," an account of visits to some of the old houses and sites connected with Johnson's history. Mr. T. B. Graham's article on "Thule and the Tin Islands" is a consideration of the possible locality of Thule and of the question of Phœnician connexion with early Britain.

Mr. J. Theodore Dodd's article in *The New Review*, "What can the Government do for the Poor at Once?" is well meant but utterly fallacious. It is a dressing out again, under the wing of an ancient statute, of the fatal superstition of "finding work" for the unemployed.

In the *Pall Mall Magazine* Mr. George N. Curzon, in No. 2 of "Strange Cities of the Far East," gives a description of Hué, in Annam, the illustrations to which are rather slight and disappointing. The best illustrated article is that called "In Tow - Notes of a Summer Cruise on Inland Waters"; the various river scenes which accompany this are admirable in artistic feeling and effect. The second part of "The Follies of Fashion" contains some interesting reproductions of old satirical prints.

To the *English Illustrated* the Duchess of Rutland contributes a short account of Belvoir Castle, with some illustrations of the interior, including one of the wine-cellar with its ponderous vaulted roof; also a view, apparently from an old print, of the castle which was burned down after the Civil Wars, a square squat building surrounding a central court, and with two wings extending a short way forward on the principal front, with a semi-circular fore-court and rampart or sunk fence in front of it. The third article on "The Romance of Modern London" is a description of a trip on an engine on the Underground Railway. The illustrations give a good idea of the scenery of the railway as seen from the engine-drivers' point of view.

The *Strand Magazine* (for July—the *Strand* does not appear till the middle of the month) contains an article on Buckingham Palace signed "Mary Spencer-Warren," which is of some interest in view of the large number of illustrations of the interior, which is not open to the public at any time; for the production of these, as well as for permission to go through the Palace in preparing the article, the special permission of the Queen was given. We have thus a glimpse of an interior which is little known to Londoners, and few would suspect that the exceedingly dull and uninteresting façade of

Buckingham Palace concealed so many really fine and architecturally effective rooms.

In *London Society* an article on "A West in Worcestershire" gives a pleasant summary, in a readable and popular manner, of some of the places of interest, archaeological and otherwise, in the county.

The *Antiquary* contains a letter from Mr. E. H. Warren, explaining the use which he has really been making of a certain patent cement piecing together and preserving, not re-casting the sculptures on Magdalen Tower. The point of the matter is that the makers of this cement are issuing a trade circular giving many instances of its use in restoring figures, mouldings, &c., by various architects, who are probably as guileless of any such practice as Mr. Warren, and, as the *Antiquary* observes, would do well to stop this use or misuse of their names. Most of the articles in this month's number are continuations of serial articles to which we have already drawn attention.

WATER FILTRATION—MECHANICAL AND BIOLOGICAL.

In the whole course of the prolonged enquiry of the Royal Commission on Metropolitan Water Supply, there is nothing that has been more interesting theoretically, and in its outcome more practically important, than the gradual evolution of a seeming paradox and of the explanation finally given of it. The filtration of the water by the companies was at first assumed to be a mechanical process. It was taken for granted that the interception of microbes was merely a question of the smallness of the interstices through which the water had to pass, and that, if the smallest known microbes were stopped, it would follow that those that were larger could not get through the sand. Next, the theory of simple interception was varied by one of attraction—the particles held in suspension in the water were said to be attracted to the grains of sand and to adhere to them; and it was held that this process of attraction and cohesion was the important factor in filtration, rather than the forcible stoppage of minute particles in their passage through the sand. Then it came out that perfectly clean filters did not stop microbes so well as filters that had been two or three days in use, that it was necessary to refill the water from a clean filter in another filter, and that a clean filter had to be partially polluted before it could be trusted to do its work efficiently. On page 297 of the *Builder* of April 15 last, Dr. Edward Frankland is reported to have said that one of the chief agents in efficient filtration is a "coating of something or other on the surface of the filter which arrests microbes from getting into the sand at all." He added, "It is the cleaning of the sand which is dangerous, and the longer a filter is in use the more efficient it seems to become." Dr. Frankland put in a table which seemed to show that the company "which cleans its filters less frequently delivers the best water, both as regards the bacteria and chemical purity." Professor Dewar, in examining Dr. Frankland, spoke of "an organic film which forms upon the surface" of the sand, of "this gelatinous membrane," and "this film of gelatinous material, living material, on the surface of the filters." Dr. Frankland said that at the time he had had no opportunity of examining it, but he believed it to be "one of the chief agents in efficient filtration." The last word upon this subject was that of Dr. German Sims Woodhead, who had made the examination which Dr. Edward Frankland contemplated when he was before the Commissioners. With Dr. Woodhead, as an expert reviewing the recent experiments of Mr. Scott Moncrieff and Dr. A. C. Houston, the paradox had become a biological filtration, which could be scientifically explained. While Dr. Woodhead fully acknowledged the original experiments of others, he gave an authoritative explanation of so practical and suggestive a character as to make it invaluable to all concerned in the superintendence of filtration. That explanation seems to have a direct bearing upon the Tees case. When the filters became clogged with the pollutions of the flood water and the uppermost sand was removed hastily twice a day, it may be a question whether that removal did not destroy the gelatinous film necessary to biological filtration, whilst at the same time reducing the mechanical filtration by diminishing the thickness of the sand. With this introduction, we extract from the document submitted to the Water Commission by Dr. Woodhead the passages dealing with the theory and practice of filtration. Speaking of the process of purification





ROYAL SCHOOL OF ART NEEDLEWORK, IMPERIAL

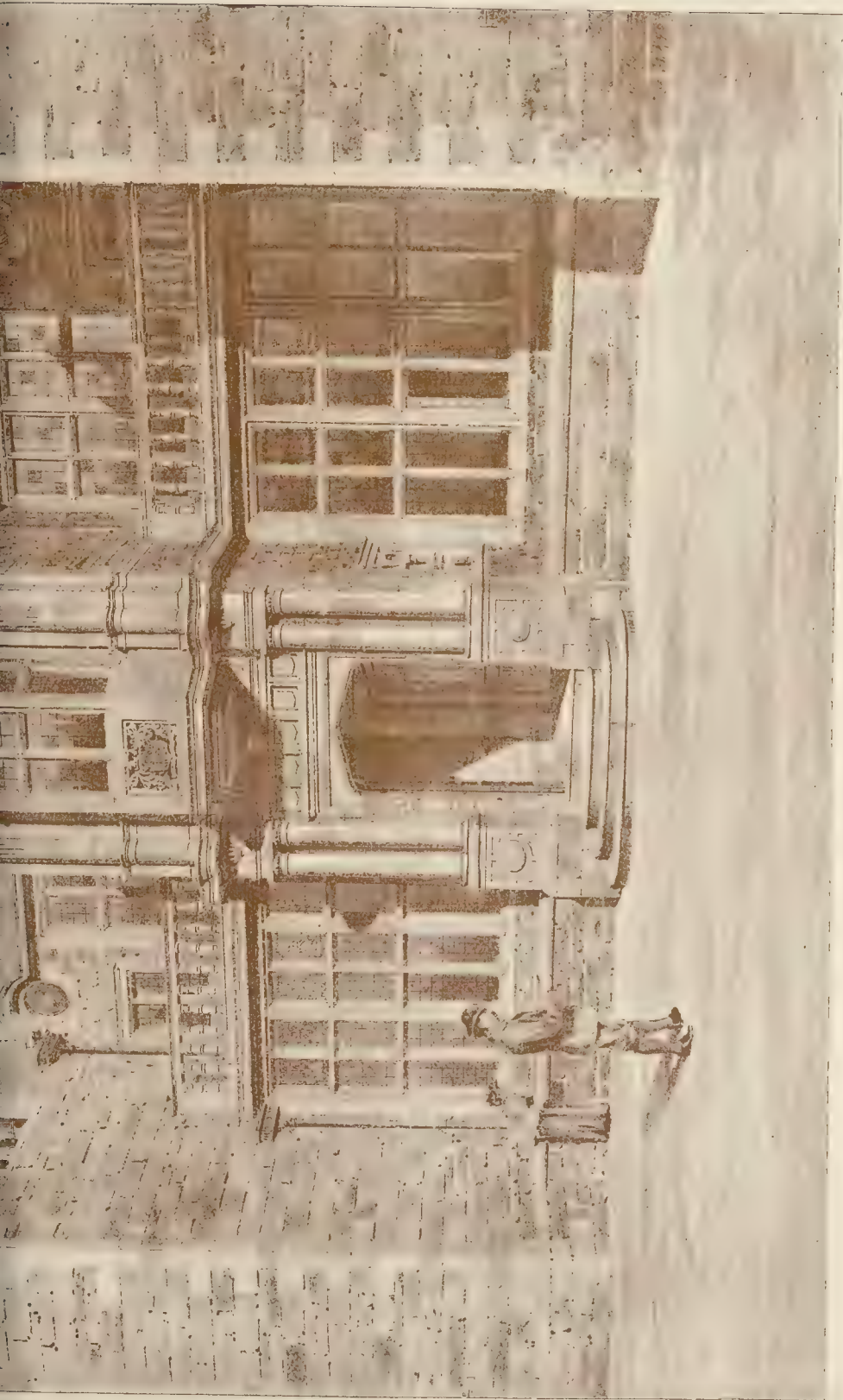


THE ROAD—MR FAIRFAX B WADE, F.R.I.B.A., ARCHITECT



THE BUILDER, AUGUST 12, 1893.





FRONT ENTRANCE TO ASHBY FOLVILLE MANOR LEICESTERSHIRE MR JOHN ELY, F R I B A, ARCHT

on which goes on in the sluggish reaches of a river where there are ordinary bacteria, he says—

"It is as the water passes over the beds, already teeming with micro-organisms, and the organic matter, that much of the preliminary purification of the organic matter being here broken down and prepared for oxidation in the more rapid reaches of the stream. We have evidence of this in the recent experiments, many of which I had an opportunity of examining closely, made by Mr. V. D. Scott Moncrieff, C.E., and Dr. A. C. Houston. Mr. Moncrieff, in treating sewage, uses filter-beds in which he is able to peptonise large quantities of organic matter. He passes the sewage through a filter composed of coke, which he has saturated with the most pure cultures of peptonising organisms, that is, organisms which liquefy gelatine. By means of this biological filter, faeces, paper, and other animal and vegetable substances are rapidly broken down and brought into solution, this process corresponding almost exactly with what is taking place, though slowly, in the bed of a river, and rapidly near the surface of humid, porous, well-aerated soil or mould. The decomposition of organic matter undoubtedly goes on in water more rapidly in the bed of a river over which well-aerated water passes, but not nearly so rapidly as at the surface of the earth. This may be readily followed by every one who will, on the one hand, repeat Dr. Poore's experiment of filtering urine through garden mould (which contains a large number of organisms), in which the process of nitrification goes on with very great evenness and rapidity, and on the other will trace the changes that take place in water containing an equal quantity of organic matter when kept constantly aerated by means of a pump, or of a small paddle working in a rough containing the mixture to which water is daily added to make up for evaporation. Both these sets of experiments have been made on separately, the one by Dr. Poore the other in various aquaria. I hope to carry them on side by side, using the same materials.

Filtration is now acknowledged on all hands to be of two essentially different kinds: (1) merely mechanical filtration; (2) biological filtration. A layer of sand through which only a small quantity of water passes, especially if that water contains micro-organisms that have been made in pure cultures, and which, therefore, however much water may be shaken up, are agglomerated in larger or smaller masses, will keep these micro-organisms back in its superficial layers, and the filtrate will contain few or no organisms. If, however, a continuous stream of sterilised water be afterwards passed for some time through this filter, the micro-organisms originally put in will eventually appear at the other side of the filter. We have in this case a coarse mechanical filter which keeps back the organisms for a time, and which, if only a small quantity of fluid be used, would appear to be perfect; when the larger quantity of fluid is used, its inefficiency is made manifest. This happens when mechanical filtration is carried on on a small scale in laboratory work. An example of a more perfect mechanical filter, in which it appears that the organisms only get through by a process of growth, is the Chamberland filter.

Of the biological filters we have perhaps the best experimental example in Dr. Poore's earth filters, in which there is going on, as a result of the action of nitrifying organisms of the soil, a continuous transformation of the organic constituents of urine, and at the same time a retention of the micro-organisms in the superficial layers of the filter, so that the filtrate is found to contain, even when incubated, no micro-organisms which can cause turbidity in the fluid. The process that goes on here is almost analogous to that which goes on after a sand filter has been in use for some little time. There is deposited on the surface of the filter after the first day or two a layer of organic matter in which micro-organisms are present in enormous quantities; these form a kind of cohesive mud through which water and substances in solution may pass, but micro-organisms are, in great part, kept back; whilst it is probable that a fraction of the organic matter in solution is also acted upon by this thin layer of micro-organisms embedded in dead organic matter; so long, therefore, as this film remains unbroken, and at the same time permeable to water, we have the most efficient filtration that can be devised for water taken from settling ponds, or from reservoirs, but this filter, good as it is, does not give results equal to those obtained in a good natural earth filter that is not overworked.

Such a mould or earth filter must be used so that the water passes intermittently from layer to layer, oxidation taking place between each passage of water, and it really comes to this, that the richer the filter is in micro-organisms in its superficial layers, and the more oxygen that can be admitted along with the water and the organic matter in solution, the more complete is the transformation of the organic matter in the upper layers and the fewer the micro-organisms that leave these layers for those immediately below. When all this is said, however, the addition of every foot of mechanical filtration must always be an increased safeguard against the passage of micro-organisms, especially as in these layers, air and organic matter are left behind. As an example of capillary filtration the bent tube of Pasteur's flask may be mentioned, through which, if a drop of water be left in the bend, no micro-

organisms will pass; they adhere to the wall of the tube, and can only be washed away by a stream of water.

If river water must be used, every possible precaution should be taken against its being made a receptacle for unpurified sewage. It is almost impossible during periods of flood to obtain it free from large quantities of surface drainage, but it should be insisted that in ordinary weather there should be no surface drainage directly into the Thames or into its tributaries. Some arrangement must be made for a discrimination in the collection of sewage; the most perfect plan would be to collect the solid excreta, which should be dug into the surface of the soil on suitable land; a certain amount of urine would no doubt have to go with this, but slop urine and slops generally might be utilised on farms which could be treated as biological filters. It must be remembered that sand, ashes, gravel, and similar materials, without the presence of some earth or organic matter, merely act as mechanical filters and not as biological filters; they possess, however, the great advantage of porosity, in consequence of which they are very easily aerated. Chemical sewage from various kinds of works should be treated separately, and should not be allowed to be thrown into the river in an unpurified condition, nor should it ever be allowed to pass on to the sewage farms, where—as when chloride of lime and similar substances are present—it would interfere most materially with the biological filtration action of the soil by retarding the multiplication of micro-organisms, and thus interfering with the process of mineralisation of organic matter. It is evident that the Moncrieff sewage filter may be found useful in connexion with the sewage farms in reducing the whole of the solid matter into solution, and thus rendering the process of sewage manuring more regular, and, therefore, less disagreeable, especially in those instances which are impossible to keep the solid sewage separate from the liquid. The sewage farms should never be allowed to be too near the river, and, where possible, there should be a considerable fall in the intervening lands between the sewage farm and the river. All water pumped from the river should, before it is passed through the filters, be stored in settling-ponds or reservoirs into which burnt clay or lime, in fine powder, and mixed with a small quantity of filtered water, may be from time to time thrown. The storage reservoirs or ponds from which the water is filtered should be sufficiently extensive to render the taking of water during periods of flood quite unnecessary. The sand filters should never be less than 3 ft. thick, should be disturbed as seldom as possible after they are once got into work, and should never be brought into use until the biological filtering layer has been formed; the time necessary for this formation to take place varies according to the amount of solid organic matter and the number of organisms in the water; the more the water requires to be filtered the more rapidly does the biological layer become efficient; none of the water that is passed through the filters during the first few days, that is, whilst the filter is "setting," should be passed into the mains until it is again passed over an older filter. We have to deal with water as the water is consumed by customers, not as it passes into the filter-wells, but as it is delivered through the mains, or after it is passed through the cisterns; the test of the microbial purity of the filter-wells will never give the same results as when the water in the cisterns, or from the delivery-pipes, is examined. It must be borne in mind that, if the organisms are kept back in relative proportions only, if there is one typhoid bacillus or one cholera bacillus in a million, and if these typhoid bacilli can pass through, they may pass through in the same proportion as the other organisms, so that under suitable conditions, such as are found in foul cisterns placed in or near warm rooms, the conditions for their development may be so favourable that they may become a real source of danger to a household, or to a part of the community.

It might be mentioned that Carl Fraenkel has found that cholera bacilli actually pass through sand filters, and that, therefore, during the period before which the biological layer is formed, there is a possibility of the typhoid bacillus and of the cholera vibrio passing into the water supply and getting into the cisterns, and coming under the favourable conditions above mentioned.

So long as it is possible for accidents to happen in connexion with the filtration of the water supply, and as such accidents may happen just at the period when the greatest care is necessary for the exclusion of organisms from the mains, so long must there be a possible danger of infection by water that contains a large quantity of animal organic matter."

THE HIGGATE MUSEUM OF SANITARY APPLIANCES.—During the past seven months—from January 1 to July 31 inclusive—no less than 10,000 persons have visited the Higgate Museum of Sanitary Appliances, which shows that the efforts of the Sanitary Authority in establishing this, the first museum of its kind in the country, have been appreciated by the public. The total number of visitors to the museum since it was opened by the Right Honourable the Lord Mayor on December 8 last amounts to 12,989, or an average of sixty-four persons per day.

Correspondence.

To the Editor of THE BUILDER.

GLASGOW MUNICIPAL BUILDINGS.

SIR,—As a rule I never write letters to the papers, but when a journal like the *Builder* (August 5, p. 98) makes quotations from other papers, and comments which I know to be incorrect, perhaps I may be excused from breaking this rule for once, without entering into any discussion.

You say the "smoke test" if applied to either system of pipes would, if continued long enough, fill every pipe in the building. This is a very big *if*. As a matter of fact, all waste pipes from lavatories and sinks are disconnected from the drains, and, quoting from specification, "discharge in open over-grated traps in areas." The waste pipes from lavatories and sinks to be untrapped from the opening at the bottom to that above the roof, so as to admit a free current of air through the pipes. (The traps to be in the branches, before they connect with the main waste pipes.)

Now, how can you support the statement that the "smoke test" applied to either system could fill these waste pipes, seeing there is an open-air space between them and the traps connecting with the drains? I think you will agree with me that it is a very big *if*, and that the smoke test would have to be continued a very long time.

Next you say the closets are all trapped with C-traps. As a matter of fact there are two different kinds of closets, the valve, and wash-out, and at least two different kinds of traps, and for a good reason. The committee or sub-committee, before deciding upon any water-closet, examined many different kinds, and in this, as in all sanitary matters, they had the best official advice in the ripe experience of the late City Architect, who took a special interest in all the sanitary work, and also in the practical experience of the clerk of works. Every w.c. apparatus was claimed to be the best as a matter of course, and owing to difference of opinion as to which was the best, it was decided to use two different kinds, both good, and find out, from use, for themselves, which was the best.

I shall only refer to one other point, the ventilation of the soil pipes, which, quoting from specification again, are "continued straight up above the roof. All the traps to be in the branches before entering the soil-pipes, so that the ventilating current may be from the top of the soil-pipe downward, and through the drain to the back of the boilers and up the boiler flue." This flue is about 90 ft. high above the ground line.

At the completion of the works the whole of these soil-pipes were tested by the ventilating engineer with an anemometer, which registered a strong down current, and were acting perfectly.

But supposing the current was the other way, and up the soil-pipe, which is open at the top, the ventilation would be equally secured, and in fact would be the ordinary way of ventilating. With a current either up or down, no gas could form in the soil-pipe, and it could not, therefore, get into the building through the traps.

Having already shown that the waste-pipes are open at top and bottom, and disconnected from the drains so that no gases could form there, I think it will be clear to all those who understand such matters that your statement that the building on which the inhabitants of "Glasgow paid themselves must be in a very unsatisfactory state," &c., is not founded on fact.

W. YOUNG.

* Mr. Young should have written to the Glasgow Sanitary Inspector who made the official report, not to us. As we put in print some of the facts mentioned in that report, we are quite willing to give Mr. Young opportunity to state his own case in our columns; but, as anyone who reads our "Note" will see, the whole of the statements made in it are merely a *résumé* of the statements in the official report, and are given as such. The only remark in the "Note" for which we are responsible is the concluding sentence, that "the building must be in a very unsatisfactory state as regards sanitation"; and no one who read Mr. Peter Fyfe's report as published in the Glasgow papers could come to any other conclusion. We observe that Mr. Young does not deny the D-traps, he merely evades the point.—ED.

INCREASE OF RUSSIAN DUTIES.—The Russian Government has decided to increase the duties on a number of articles imported from countries which do not extend to Russian goods the "most favoured nation's clauses" (including Great Britain). An increase of 30 per cent is imposed on the following articles:—Wood goods, dressed and undressed stone, alabaster, gypsum, earthenware goods, glass-ware, gold, silver, and platinumware, copper, iron, steelware, tools, machinery, apparatus, locomotives, and a number of other articles. An increase of 20 per cent is imposed on the following articles:—Wood, building materials, tiles and bricks, asphalt, iron, tin, steel, copper, aluminium, nickel, lead, tin, zinc. Should the above articles be imported from countries outside Europe *via* European ports, an extra all round duty of 15 per cent is imposed.

The Student's Column.

GEOLOGY VII.

ROCK-FORMING MINERALS (CONTINUED).

OLIVE remaining common rock-forming minerals of the silicate group, which we now propose to describe, are olivine, serpentine, zeolites, kaolin, and glauconite.

Olivine, or peridot, crystallises in the rhombic system, sometimes in the form of transparent crystals, with edges more or less rounded off or as rounded granules; cleavage in two directions; colour, generally dark green, but may be brownish; lustre, vitreous; fracture, conchoidal; hardness, 6·5-7·0; specific gravity, 3·3-3·5; chemical composition, silicate of magnesia and protoxide of iron. It is a common constituent of many volcanic rocks, and is very susceptible of the action of the weather. It frequently occurs in a much altered condition, the change having been effected by the agency of heated water, &c., when it ceases to become transparent. It enters into the composition of several kinds of road-metal, and may often be found in certain foreign ornamental stones.

Serpentine occurs in volcanic rocks, and also metamorphic, as large masses, constituting the rock of the same name. In most instances it has resulted from the alteration of olivine, for every gradation can be traced from this latter into true serpentine. It is not easy to understand, however, how massive rocks, formed almost entirely of the mineral, can have their origin in the manner indicated. Serpentine has no definite crystalline form, being fibrous, granular, or compact; its colour is extremely variable, but chiefly green, red, or grey, mostly streaked and spotted; as might be gathered from its origin, it is not as hard (3-4) as olivine; specific gravity 2·5-3·7; chemical composition, hydrous magnesian silicate, with a little ferrous silicate. It weathers very easily, but from the circumstance that it takes an excellent polish, and has a very handsome appearance, is extensively used as an ornamental stone, in the form of small pillars, slabs, &c. No one who passes up Regent-street, and regards attentively the condition of the stone on certain exteriors, can have any doubt that it is not at all suitable for such work. When carefully selected it may, however, be used for the minor enrichments of interiors.

Zeolites is a generic term, including several minerals formed by the alteration of other minerals. They are mostly transparent and colourless; hardness, 4·0-5·5; specific gravity, 1·9-2·5; chemical composition, hydrous silicate of alumina, with lime, soda, potash, or baryta. These minerals occur filling up cavities and cracks in rocks, and may be very minute.

Kaolin, or China-clay, is also an alteration product, and results from the decomposition of felspar. Chemically, it is a hydrous silicate of alumina, being the principal material from which porcelain and China-ware is made; when pure it is quite white; the mineral occurs more generally, however, in an impure form, mixed with iron, quartz grains, &c., forming the clay used in brick-making.

Glauconite does not occur in a crystalline form; colour, green, yellow, or grey; opaque; hardness, 2; specific gravity, 2·2-2·4; chemical composition, variable, essentially hydrous silicate of iron and potash, with alumina, lime, and magnesia. It is largely found in sands, the lower part of the Chalk formation, and in some other limestones. The greenish tint of many of the kinds of rocks enumerated is frequently due to the abundance of glauconite in them.

We now pass to the consideration of the carbonates, some of the varieties of which are amongst the commonest minerals in the earth's crust. The only ones necessary for our purpose are calcite, aragonite, and dolomite.

Calcite crystallises in the hexagonal system, occurring as crystals, but principally also without definite form; it may be fibrous, nodular, or earthy; cleavage, perfect; colour, mostly white or light yellow; transparent, cloudy, or opaque; hardness, 2·5-3; specific gravity, 2·6-2·7; chemical composition, carbonate of lime—lime, 56; carbonic acid, 44 per cent. It effervesces easily with acids. Possibly no mineral presents more interest to the architectural student than calcite; it is the main ingredient of the limestones used for building purposes, and in this connexion exists in a variety of ways, each possessing some important meaning. Freestones, as is well known, are of varying degrees of durability, some forming the best of building materials, others being quite worthless in that

respect. We are anticipating a little, but it may be stated that the rapidity with which a limestone weathers is in a large measure due to the state of crystallisation of the carbonate of lime of which it is composed, and to the general binding together of the constituents of the stone by the same mineral. Lime used for building purposes is also derived from this carbonate, whether in the crystalline form or otherwise, and the quality of the lime is necessarily greatly dependent on the particular class of limestone used in its manufacture. One of the raw materials from which ordinary cements are produced is lime, and although the quality of the product is mainly due to the care exercised in its preparation and manufacture, the actual nature of the lime itself is a matter for careful consideration.

Aragonite crystallises in the rhombic system, and when free shows six-sided prisms; it occurs principally in veins, also globular, stalactitic, or encrusting; colour, mostly white or yellowish; cleavage, perfect; transparent, brittle; hardness, 3·5-4·0; specific gravity, 2·93; chemical composition, precisely similar to calcite. It is stated that carbonate of lime deposited from cold solutions crystallises in the hexagonal system (calcite) and from warm solutions in the rhombic (aragonite). We give this for what it is worth, but cannot think there is much truth in it. It is certainly difficult to understand why a carbonate of lime should take on two different crystalline forms, and there must be some reason for it, but what that reason may be remains for the present unknown. If we study the occurrence of calcite and aragonite in nature, especially in certain limestones in which the two minerals are found side by side, their minute structure seems to indicate contemporaneous origin—a circumstance not in favour of the "hot and cold" hypothesis. We do not, however, dispute that calcite has never been formed from cold solution, nor aragonite from warm; what we do say is that the minerals have not always conformed to those modes of origin, and we think that the facts associated with their occurrence substantiate this. Collaterally, we may observe that marine mollusca, living together in the same parts of the sea, secrete lime from the sea-water for the purpose of constructing their shells, and they have the power of fashioning that lime into calcite, or aragonite, as the case may be—following the species. This is an interesting subject, and, strange as it may appear, has considerable bearing on the durability of some shelly limestones. The shells in the latter may be composed of aragonite or calcite, or specimens of both, though they may not originally have been so formed—some shells by certain processes (to be described in another article) having been altered from calcite to aragonite, or *vice versa*, since their original deposition. The practical bearing of this observation will be apparent when we state that aragonite, although a harder and denser mineral, and of identical chemical composition, yields to the action of the weather much more readily than does calcite. Unfortunately, it is very difficult to distinguish the one mineral from the other, except by a very minute and skilful examination, and there is but little doubt that the superior hardness and compactness of limestones largely made of aragonite have often led the architect and builder to select them in preference to the softer kinds, in the belief that the harder material must, of necessity, be the more durable. Not that we wish to lay down the law that soft limestones are always more durable than hard; it is purely a case where science alone can determine the selection. But, if it is difficult to differentiate the two minerals under discussion from each other, it is, fortunately, comparatively easy to distinguish them from others. The elementary student on examining stone will, at the first glance, mistake crystalline calcite and aragonite for quartz, or *vice versa*; but, if the following be observed, there need be no hesitation in the matter. A crystal of quartz will scratch both the other minerals, being so much harder than they. Quartz cannot be scratched by the point of a knife, orthoclase felspar (somewhat like certain forms of calcite) is only scratched with difficulty, but either of the crystalline carbonates of lime will yield easily. Further, whilst a drop of weak hydrochloric acid, when applied, will cause both calcite and aragonite to effervesce freely and briskly, it will have no effect on quartz. It is very doubtful whether calcite is an original constituent of igneous rocks; it is chiefly confined to the aqueous.

Dolomite crystallises in the hexagonal system, but commonly occurs in a massive form constituting beds of great thickness and of considerable

geographical extent. Its colour is white, but most frequently light yellow and brown; hardness, 3·5-4·0; specific gravity, 2·8-2·9; chemical composition, typically, carbonate of lime, 54·35; and carbonate of magnesia, 45·65 per cent. This rock forms one of the most valuable building stones in the country.

We cannot conclude our remarks on the mineral carbonates without observing that in addition to forming the bases of certain classes of building stones, limes, cements, &c., they are found universally diffused in water. The hardness of water is dependent on the quantities of carbonates of lime and (in a minor degree) magnesia contained in it. The student will perceive that in softening water to render it available for certain commercial and domestic purposes, the only consideration is how to get rid of these carbonates, and occasionally, sulphates.

Amongst the sulphates we shall merely allude to gypsum and some of its varieties, as they are the most important for our purposes.

Gypsum crystallises in the monoclinic system, but frequently assumes a fibrous or granular structure; lustre, silky; chiefly colourless or yellowish; hardness, 1·5-2·0 (can be scratched by the finger nail); specific gravity, 2·3; chemical composition, hydrous sulphate of lime. It occurs massive in beds of enormous extent, and of considerable commercial value. Sometimes it is collected and burnt like ordinary limestone to manufacture plaster or cement. The calcining of gypsum does not involve its decomposition, but its water being driven off by the heat, there is left only a soft white powder—Plaster of Paris. When this is again united with water, the latter is re-absorbed and the mass becomes first plastic, and then solid; but it cannot, by this means, be brought back again to its original semi-crystalline condition. *Selenite* is a name commonly given to crystals of gypsum. *Alabaster*, properly so-called, applies to the very fine-grained compact and massive varieties of the mineral. It is used as an ornamental stone, but cannot be recommended for exteriors.

The last mineral we shall now allude to is asphaltum, which, however, is not a common rock former.

Asphaltum may be described as mineral pitch; it is a mixture of different hydrocarbons; black, or brown; soft, or solid. It occurs in great quantity in the Pitch Lake of Trinidad; also impregnating rocks. The rock-asphalt of Seyssel and Neuchâtel is a limestone containing variable quantities of bitumen, soluble in bisulphide of carbon. It decrepitates on being heated, but when the powder in that condition is compressed by iron rammers, it consolidates, making a hard compact material, largely utilised in street-making, and, in a lesser degree, for waterproofing roofs.

GENERAL BUILDING NEWS.

ST. CHADS CHURCH, WYLSNORY, CHESHIRE.

—This church was erected on the ground on which the nave, aisles, and chancel have been entirely rebuilt in the Perpendicular style on to an old tower. There have been several churches built upon the site before, which have repeatedly given way, owing to bad ground. To avoid this the new church has been built upon a slab of cement concrete covering the whole area. The upper portion of the tower has also been restored, the entire cost being about 7,000l. The architect is Mr. James Brooks, of London, and the builders were Messrs. Treasure & Son, of London and Shrewsbury.

PROPOSED ADDITION TO MARKET LOUTH.—We understand that the Town Council of Louth has decided to make certain additions and alterations to their cattle and pig market. The Borough Engineer and Surveyor, Mr. Thomas Rowland, C.E., has been instructed to prepare plans and specifications for the proposed extensions.

RESTORATION OF BETTWS CHURCH.—The consecration of the new north aisle of the parish church of Bettws, St. David's, in the township of Llandaff took place on the 4th inst. This ancient edifice has been entirely restored, and has also been enlarged by the addition of a north aisle, which has practically doubled the seating accommodation. Mr. Halliday, of Llandaff, was the architect; Mr. J. W. Podger, of Cardiff, was the contractor; and the sculpture and carving work was executed by Mr. Glyn of Llandaff.

EXTENSION OF EDINBURGH POST OFFICE.—According to the *Standard*, the work in connexion with an extension of Edinburgh Post Office is just on the point of completion. The necessary site was found in a piece of vacant ground at the south-east corner of the Post Office, and a wing has been raised thereon overlooking the North British Railway, and corresponding with the Classical style of the old buildings. The new works have been carried out from designs by Mr. W. W. Robertson, of the Board of Works, by Mr. Colin Macandrew, builder, Edin-

burgh. Mr. John Breingan, architect, St. Andrew-square, has acted as clerk of works. The new building is four stories in height—representing 100 ft.—and provides at the different levels four large halls about 80 ft. square. The basement floor will be reserved for the telegraphic batteries and stores; the new hall on the next floor is on a level with the present telegraphic instrument room. On the level of the North Bridge is situated the sorting and letter carriers' hall, and this has been extended by throwing into the new hall at this level, and thereby nearly doubling the present accommodation. An additional story has been built upon the old sorting-room, and that, with the new hall on the corresponding level of the new wing, will form the new instrument room, which will be 130 ft. long by 85 ft. in width—the only portion reserved being a well in the centre, which is carried up to the roof for lighting a portion of the sorting-room below. The south-west corner of the new wing is a smaller flat in which are placed the kitchen and dining halls for the employees. To these rooms access can be had from all parts of the building by a separate staircase. The larger of two dining-rooms is 45 by 21 ft., and on the same level there are retiring and reading rooms for the women clerks, and a room which is to be fitted up as a library. The walls of the new wing have been built of solid rubble work. The floors of the different halls are carried on steel girders, which were built by Redpath, Brown, & Co. The average height of the different floors is 23 ft., and each is made fireproof by a layer of concrete. The heating is by hot-water pipes, fitted up by Messrs. Mackenzie & Moncur. A hydraulic hoist connects the parcel post office and sorting-rooms floors; and at present there is a lift from the North British Railway station platform to the sorting-room on the North Bridge level. At the north-east corner of the post office buildings a new public telegram office has been constructed, 25 ft. square. Above the new telegraph public-room is a flat on which have been placed the cloak-rooms and lavatories for the male telegraphic staff. The cost of the whole additions will be between 25,000l. and 30,000l.

ALTERED VIEW OF THE WESLEYAN CHAPEL, LEEDS.—The trustees of the chapel are about to make various improvements to the building. A new stone doorway is to be placed in the centre of the front for the use of the congregation on the ground floor, with lobbies and vestibule formed of moulded screens filled in with tinted, leaded lights and with tiled floors. All the doors about the chapel are to be made to open outwards. Two vestries are also to be formed on the ground floor for the use of the minister and choir. The arrangement of the aisles and pews is also to be improved, a new warming apparatus is arranged for, and the chapel is to be painted and decorated. The whole of the work is being carried out from the design, and under the superintendence of, Mr. G. F. Danby, architect, of Leeds, at a cost of about 1,500l. The contractors are Messrs. Craven & Unwin (woodwork), G. Myers (stonework), G. Hummerston (decorator), and Holmes & Co. (warming).

ST. ANNE'S CHURCH, EASTBOURNE.—Two new transepts have just been added to this church, and the vestry has been enlarged. The new works are in keeping with the older works of the church. The facings are of Kentish Rag, relieved with Bill stone. The cost is 1,400l. The architect is Mr. H. Spurrell, R.I.B.A., and the builder was Mr. Chas. Peerless-Dennis, Eastbourne.

SANITARY AND ENGINEERING NEWS.

THE SANITARY CONDITION OF GLASGOW.—Mr. Peter Fyfe, Chief Sanitary Inspector for Glasgow, has just issued his twenty-third annual report on the operations of the Sanitary Department for the year ending December 31 last. In the introduction to his report Mr. Fyfe says:—"The death-rate of the extended city for the year 1892 has kept within a very reasonable limit. It was 22.8 per 1,000 per annum. In the old city it was 23.6. The addition of our suburbs has accordingly subtracted 8 per 1,000 per annum from the death-rate, that is to say, the 100,000 persons who dwell beyond the confines of what was the city proper before November, 1891, by mingling as one community with the 560,000 people of the old city, have so lowered the rate over the whole population that the Greater Glasgow, with its extended area, conserves 528 lives she would lose every year under the hygienic conditions found in an old Glasgow of equal size. This result was fully anticipated. An earth area for the people obtains in the suburbs very different to that in possession of the denizens of the old city. Where abundance of fresh air and fields unbuilt upon by human beings when live healthier and live longer, although in themselves and in their homes they are not much cleaner nor tidier than their less fortunate confreres in the crowded districts. . . ."

SEWAGE DISPOSAL, PUDSEY, YORKSHIRE.—On the 3rd inst. Mr. Rienzi Walton, C.E., Local Government Board Inspector, held an inquiry into the proposal of the Pudsey Local Board to borrow 35,000l. for purposes of sewerage and sewage disposal. Mr. Dutton, who represented the Local Board, stated that the population of the district in 1891 was 13,444. The sewerage of the town had engaged the attention of the Board for many years. In 1885 a plan was prepared for them by Mr. J. H.

Rhodes, C.E., of Leeds, but there was no disposal work connected with that scheme. About a year ago the Board decided to have the scheme of 1885 revised, and provision made for the purification of the sewage of the town. The present application was for money to carry out the scheme. The sewers were calculated to discharge a flow of sewage of twenty-five gallons per head of the population when the various areas were built upon, and a rainfall of a quarter of an inch in twenty-four hours. It was proposed to construct two separate disposal works—one at Smailewell and the other at Hough Side. There will be short lengths of sewers in the Leeds district, at Hough Side, and Pudsey-lane end. The sewage disposal works at Hough Side will provide three large tanks and filter-beds. These works are calculated to deal with 240,000 gallons per day, after allowing one tank to be constantly in reserve. There will be three similar tanks at Smailewell, but of a smaller size. The system of purification will be by perchloride of iron.—Mr. W. Spink, engineer of the proposed works, then described the plan in detail. The total capacity of the tanks at Hough Side was 480,000 gallons a day, and at Smailewell 50,000 gallons a day. The greatest depth reached by the drains would be 8 1/2 ft., and the 1,128 yards of tunnelling from Stanningley would average 53 ft. in depth. Other evidence having been given, a vote of thanks was awarded to Mr. Rienzi Walton, and the inquiry terminated.

MACCLESFIELD SEWERAGE.—The Local Government Board having granted the Macclesfield Corporation a Provisional Order for the compulsory purchase of 200 acres of land for sewage disposal purposes. The confirmation of the Order was unsuccessfully opposed by certain land-owners in the House of Commons. The Confirming Bill came before the House of Lords on July 27 and 28, where it was again opposed by the land-owners, who objected to the sale of the site, and to the treatment by irrigation. After hearing the evidence on both sides, the Committee confirmed the Order, subject to the sewage being filtered through coke, after subsidence in tanks, before application to the land. The sporting rights were also reserved to the owners. The engineer to the scheme is Mr. W. H. Radford, of Nottingham.

FOREIGN AND COLONIAL.

FRANCE.—On Friday, the 4th inst., at the École des Beaux-Arts, the exhibition of designs submitted by the students in competition for the Grand Prix de Rome (Architecture) was opened. The subject given to the *logistes* was "a palace for the learned societies." The ten competitors were, in order of classification, MM. Depertthes, Chiffot, Dalmas, Varcollier, Letrosne, Recoura, Renevey, Patouillard, Dusart, and Chaussemiche. The award, made on Monday, was as follows:—First grand prize, M. Chaussemiche (pupil of MM. André and Leloux); first second grand prize, M. Dusart (pupil of MM. André and Leloux); second second grand prize, M. Recoura (pupil of M. Pascal).—The work of prolonging the Sceaux railway is being rapidly proceeded with, and of the 1,700 metres of tunnel, only a length of 100 metres remains to be constructed. From the 1st of August the first locomotive has proceeded as far as the cross-roads by the Observatory. . . . The Director of the Assistance Publique at Paris, are going to erect a large hospital for consumption at Agincourt (Oise).—The Department of Fine Arts has just commissioned the sculptor Crank to execute the bust of General Tramond, and the sculptor Paul Robert that of General Motras d'Hestreux, both for the Military School at St. Cyr.—The inauguration of the statue of Joan of Arc at Chinon, which was originally fixed to take place on July 30, has been postponed to August 13 (Sunday next), in consequence of delays which have occurred in the transport of this heavy statue. . . .

On Sunday last, at Chêne-Bourg, was inaugurated the statue of M. Louis Favre, the contractor for piercing the Mont Cenis and the St. Gothard tunnels. The statue, in bronze, was shown in this year's Salon, and is the work of Emile Lambert. The sculptor Ludovic Durand has just offered to give an alto-relief ("The Dying Soldier") for the monument which is about to be erected in the town of Remiremont to the memory of the young people who died for their country. The relief in question was exhibited in the Salon in 1890. On September 9, at Dunkerque, the monument commemorative of the siege sustained by that town will be inaugurated. . . . The Director of Navigation at the Ministry of Public Works has just visited, with several engineers, the Port St. Louis and the Mediterranean coasts, for the purpose of studying the scheme for piercing a canal from Marseilles to the Rhone. . . . The Government has promulgated a decree authorising the demolition of the fortifications of the town of Cambrai. . . . M. Bousard, the architect of the new Hotel des Téléphones at Paris, has just been commissioned to erect in the town of Fontainebleau a new post and telegraph office, and M. Kerviler, Ingénieur-en-Chef des Ponts et Chaussées, has been charged to direct the construction of the new post and telegraph offices at St. Nazaire. . . . The jury of the Ecole des Beaux-

Arts have just accorded the diploma of architect to MM. Recoura, Leon Rousseau, Bouts, Guesnier, Barba, Demogot, Guillemonat, Closson, Umbdenstock, Dourme, Delahaye, and Boisseau. . . . The prize in the Troyon competition (landscape) has been awarded to M. Robert Dupont, pupil of MM. E. Delaunay and Gustave Moreau. Two "honourable mentions" were accorded to MM. Paul Buffet and Charles Cachoud. . . .

BERLIN.—There seems to be a good deal of discontent about the new suburban regulations which came in force on January 1. The press is full of complaints, and papers of good standing such as the *National Zeitung* devote leading articles to the subject. The Government will probably have to cancel several of the most stringent clauses in the Act.—Professor Herter, the sculptor, is to execute a Heine monument for New York. The monument will be in the form of a large fountain, with the "Loreley" as the central figure, surrounded by three Rhine nymphs. Heine's portrait is shown in semi-relief on a medallion. The height of the monument is 8 metres or 26 ft.—A number of Government architects have been given travelling studentships, the value of which is approximately 92l. in each case. A number of the architectural assistants employed by the Government have received studentships of 45l. each.—Two competitions for designs of churches for Düsseldorf have been opened, the one building to cost 12,000l., and have 1,200 seats; the other, 15,000l., and have 1,400 seats. The same jury assesses in both cases. Professor F. Adler is one of the five members of the jury.—A new panorama has been opened as an advertisement for the North German Lloyd Shipping Company. The visitor, after passing through a very good representation of the first-class saloons, &c., of an Atlantic liner, reaches the facsimile deck, from which he sees a well-painted view of New York Harbour. Herr Petersen, of Munich, had charge of the canvas, whilst the very luxurious woodwork exhibited in the cabins is from Herr Pfaff's workshops in Berlin.

MISCELLANEOUS.

THE BIRMINGHAM ARCHITECTURAL ASSOCIATION AND BUILDERS' FOREMEN.—A development in technical education was inaugurated on the 29th ult., when some sixty builders' foremen and clerks of works in conjunction with the members of the Birmingham Architectural Association visited the new buildings in course of erection by Mr. John Bowen, builder, and Mr. W. H. Bidlake, M.A., architect, in Sheep-street, Laurence-street, Birmingham, for the Kyrie Society. The accommodation provided is a large hall with stage for concerts and dramatic entertainments, to seat 600 persons, placed in the middle of the site and lighted with clearstory windows and covered with an open timber roof, enriched with carved heads emblematical of the various crafts taught and recreations provided by the society. At the rear are workshops for carpenters, wood carvers, metal workers, and printers, and in the front block facing the street are the club-rooms for women and girls and men and boys, together with a library, committee room, and caretaker's office. The front elevation is a composition of red brick, stone, and timber.

PARTNERSHIP CHANGE.—We are informed that the partnership hitherto existing between Mr. H. Bowes Scott and Mr. Charles Western, and carried on under the name of Bowes Scott & Western, has been dissolved by mutual consent as from April 24, 1893. The goodwill and name of the firm have been acquired by Mr. Charles Western, and the business will continue to be carried on under the name of Bowes Scott & Western as hitherto.

ERRATUM (page 82 ante).—In our "Note" on Drury-lane Theatre the date 1775 appeared, through an obvious error, as "1755." We did not mean to convey that Mr. Siddons, as an actress at that theatre, was a contemporary of Mrs. Clive, Mrs. Pritchard, and Mrs. Cibber.

SURVEYORSHIP APPOINTMENT.—Mr. Arthur C. James, Assistant Borough Engineer, Cambridge, has been appointed Surveyor to the Local Board of Gray's Thurrock, Essex.

THE LONDON AND COUNTY BANKING COMPANY LIMITED.—As will be seen by the balance-sheet of this Company, which appears in our advertisement pages, the directors report that, after paying interest to customers and all charges, making provision for bad and doubtful debts, and allowing 27,207l. 6s. 6d. for rebate on bills not due, and transferring 20,000l. in reduction of premises account, the net profits amount to 221,322l. 4s. 10d. This sum, added to 61,685l. 12s. the balance brought forward from last account, produces a total of 283,017l. 16s. 10d. The directors have declared an interim dividend for the half-year of 10 per cent. which will require 200,000l. leaving the sum of 83,017l. 16s. 10d. to be carried to the profit and loss new account.

ALL SAINTS' CHURCH, WEST DULWICH.—In reference to the description of this building which appeared in the *Builder* a fortnight ago, Mr. A. Bradford, of Kennington, writes:—"Mr. J. E. Taylerson is mentioned as the sculptor. This is not correct, as the whole of the carving and sculpturing work was executed and carried out by myself." In reply to an inquiry on the subject, the architect informs us that Mr. Bradford did the general

PROVISIONAL SPECIFICATIONS ACCEPTED.
7,558, W. Wheeler, Flushing Cisterns.—7,813, A. Lowe, Combined Cross-Grooving and Stop-Grooving Plane.—12,079, W. Walton and H. Medlicott, Draught Excluding Mechanism for Use on Doors, and also for Use on Screens.

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ILLUSTRATIONS.

New City Buildings, Oxford.—Mr. Henry T. Hare, A.R.I.B.A., Architect	Double-Page Ink-Photo.
Design for House (Based on Bramall Hall).—Mr. R. A. Briggs, F.R.I.B.A., Architect	Double-Page Ink-Photo.
Architectural Association Excursion: Sketches on the Line of Route.—Drawn by Mr. Arnold Mitchell	Two Single-Page Ink-Photos.
Nixon's School, Oxford.—Drawn by Mr. Roland W. Paul.	Single-Page Photo-Litho.
University Hall Extension, Castle Hill, Edinburgh.—Mr. S. Henbest Capper, M.A., Architect	Single-Page Photo-Litho.

Blocks in Text.

Details of Fisheries Building, Chicago Exhibition	PAGE 133	Sketch showing Recently Discovered Windows, Gray's Inn Chapel.	PAGE 135
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The Larger Buildings of the Chicago Exhibition (concluded).



THE mining building, by Mr. S. S. Beman, of Chicago, is situated to the west of the Electricity Building, and has its major axis running north and south,

the southern façade facing the central court. It occupies an area of 350 ft. by 700 ft., and is principally interesting in that the cantilever system, so generally employed in bridge construction, has been employed here in the construction of the roof to the main nave and aisles. It is the only example of this in the Exhibition, and it is said to be the first application of this ancient principle of construction for the purpose of supporting a roof covering, at any rate on so large a scale. The plan consists of a nave 115 ft. from centre to centre of steel stanchions, with an aisle 57.6 wide on each side. From the steel stanchions which separate the nave and aisles, the roof of the aisles is cantilevered over in the nave for a distance of 34 ft. 6 in. on each side, the upper part of the lattice work truss being, of course, in tension and secured to the outer chord of the aisle roof, which is secured to the outer standards. The roof slopes down in one continuous line from the upper end of these cantilevered trusses over the side aisles. The space, 46 ft. wide, thus left in the centre of the nave is spanned with riveted steel trusses, joined to the ends of the cantilevers and having an elliptical lower chord, the upper part being raised to form a clearstory for lighting purposes. This central nave and aisles are in one height only and around this space are placed galleries in two heights, lighted from windows in the façades, the upper floor being additionally lighted by a raised central clearstory. This outer ring of galleries is supported entirely by columns of wood, and is covered with wooden-framed roof. The entrances are arranged in the centre of each façade, those on the north and south being the most important, and these are recessed. On either side of these four entrances are wide stair-

cases leading to the gallery floors. The exterior of the building is, like the other main structures of the exhibition, composed entirely of "staff," and is treated in a massive way, as it were, to bring out the expressive qualities of mining. The main cornice is 60 ft. high from the ground, as in the other buildings fronting on to the Great Court, and is supported on the main fronts by massive rusticated piers, corresponding with the internal divisions of the plan, and crowned with sculptured heads which act as a base for the flag-poles which crown them.

The principal fronts have semi-circular arched entrances, with sculptured figures in the spandrels and pediment, emblematic of mining and its allied industries. On either side of this central entrance is arranged a recessed loggia 25 ft. wide in two stories, the upper one corresponding with the gallery floor level from which it is reached. At each end of these fronts, at the point where the surrounding two-storied aisles intersect, low domes are formed and crowned with a small gilded lantern. A decided French spirit pervades the whole of the exterior design, and is manifested in the carving to the main frieze, in the treatment of the piers to the main entrance, with their escutcheons, and in the carving to the spandrels. The ornamentation throughout is scarcely bold enough to harmonise with the massive phase of architecture adopted. There is practically no sculpture properly so called, nor has any scheme of colour decoration been employed, as in most of the other large buildings. As for the interior, we have mentioned the somewhat novel employment of the steel cantilever trusses, and the awkward and abrupt line caused by the termination of the cantilever on each side, thus stopping the grand sweeping curve of the truss. This is all the more noticeable because we are accustomed to see the principals in these roofs extend without interruption from one side to the other. It is perhaps only on account of this reason that it is displeasing, but it certainly gives a broken line which destroys the homogeneity of the design. All credit is, however, due to Mr. Beman for his employment of a novel feature such as this in his design, and there is certainly a character and feeling about the whole composition which makes it peculiarly suitable to the purpose for which it is designed.

The Transportation Building, by Messrs. Adler & Sullivan, of Chicago, is in many respects the most remarkable and interesting on the grounds. The architects are well known as the designers of the Auditorium Theatre and Hotel, the Schiller Theatre, and other tall buildings in Chicago. The interest, however, in this case, does not come from any new development in construction, as in the buildings referred to, but simply because the building has been designed from the very beginning as a colour scheme, pure and simple. As to architectural features, as we understand them, there are none, the façades, with the exception of the great central doorway on the east front, consisting of flat plaster surfaces upon which the painting has been directly applied.

In regard to plan, the uses to which the building had to be put very naturally exercised a considerable influence in its development. In this case the architects had to consider the most convenient handling of heavy engines on rails which were to be placed transversely to the main axis of the building. They found that 16 ft. for each pair of rails allowed sufficient circulation for the public to inspect the exhibits, and by grouping these in pairs, 32 ft. was obtained as a module upon which the plan was laid out. The building itself is 960 ft. by 250 ft. and consists of a main nave 96 ft. wide, around which are placed two-storied aisles. The nave walls are carried high above these aisles and contain clearstory windows, lighting the nave and giving sufficient light for large exhibits, such as balloons and the like, which are illustrative of transportation.

Staircases for access to the galleries are arranged at each end and at the great entrance on the east side facing the lake, while transportation is well exemplified by a series of eight lifts in the centre of the building running from the ground to the roof, which is used as a promenade. This series of lifts is marked externally by a turret springing from the ridge. The façade consists of a continuous arcade, with wide piers, enclosing a subordinate colonnade and entablature under each arch, the façade being crowned with a deeply projecting cornice 53 ft. from the ground, which serves to protect the colour from the weather. In the centre of the east façade is the great semi-circular archway, with

receding planes elaborately carved, and which is known as the Golden Gateway; it is 100 ft. wide and 70 ft. high, and has a square projecting cornice raised above that to the aisle. On each side of the entrance, in the space caused by the projection of the porch, are placed octagonal kiosks with a projecting balcony under, and covered with a circular roof; these balconies are approached by external staircases, and are elaborately treated with sculptured decoration. It was originally intended to cover the whole of the central gateway with gold leaf, but from motives of economy it was treated with aluminium, and covered with a yellow lacquer, the effect of which is very fine, as, by the action of the weather, the tone varies. The parts below the surface are picked out in subdued blues and reds to accentuate the form.

The important colour scheme introduced into this building will be treated in a separate article.

The Horticultural Building, by Messrs. Jennie & Mundie, of Chicago, is situated immediately to the north of the Transportation Building, with its main frontage of 1,000 ft. facing the wooded lagoon. The plan consists of a central dome constructed with lattice ribs of light steel springing from the ground, the dome itself being 180 ft. in diameter and 115 in height, and is placed in the centre of a square pavilion. The dome is almost semi-circular in form, being struck from the level of the first story, 25 ft. from the ground, and therefore only 25 ft. more than its radius, and 65 ft. less than its diameter, which is a novel proportion for a structure of this kind. It is supported on either side with smaller domes towards the front, and, as it were, filling up the angles of the square base from which the dome springs. The main entrance, placed on the axis of the dome, consists of a projecting porch with semi-circular arched opening supported on Ionic columns and with sculpture group, on either side. At the extreme ends of the façade on either side are two storied pavilions 118 ft. on face and 250 ft. deep. These are connected with the central structure by two low one-story galleries 90 ft. apart, thus forming an open court of this width between them for the display of flower gardening, &c. The rear gallery is continuous between the main wings, but the front one stops on either side against the square mass supporting the central dome.

The roof to the front galleries is circular in form, that to the rear being a double-pitch one. It was natural that a building devoted to horticulture should take the form of a gigantic greenhouse, and the architects seem to have realised this, and further, to have succeeded in giving the building something of a monumental appearance. The central dome, which is of real utility, and even necessary for the proper display of huge palms, tree-ferns, bamboos, &c., and which is supported on either side by the two smaller domes, is a very well conceived feature, and being so low in proportion to its height seems to grow, as it were, out of the ground, and to be therefore quite in keeping with the object for which the building is designed.

As to the general scheme of the exterior, it seems to be founded, in its main essentials, more or less on the Library of St. Mark at Venice. The curtain walls consist of a series of Ionic pilasters, around which the cornice breaks 22 ft. 6 in. from the ground, the alternate pilasters being carried up and crowned with flag-poles. Between the pilasters are semi-circular arches allowing the largest possible amount of glass. The two wings are, as has been mentioned, in two stories. On the ground story the Ionic order to the curtain wall is carried round, while the upper story is also treated with the Ionic order, over which is placed an entablature with a frieze 6 ft. in depth, and therefore out of proportion to the height of the columns. This frieze is very richly modelled with figure subjects, garlands, and festoons. It was, however, deepened in this

way so as to give height to this portion of the building, and to enable it to compete with the neighbouring structures in this respect; but the exaggerated height of the frieze is hardly satisfactory, and it has not the great quality of utility which induced Sansovino to exaggerate his frieze at the St. Mark's Library. Mr. Lorado Taft, of Chicago, is responsible for the decorative modelling and sculpture on the building, some of which is unquestionably very fine. The two groups on either side of the front entrance, placed on a high pedestal, and representing the "Awakening" and the "Sleep" of Flowers, in which the principal figures are 8 ft. high, are treated with poetic feeling and thoroughness of technique, which make them worthy of more than a temporary existence. The whole structure could not be taken for anything else but a gigantic green-house, but it is a green-house in which a certain amount of graceful and monumental effect has been gained, which certainly makes it a success.

To the north of the Manufactures Building stands the United States Government Building, probably the worst in design and general treatment on the ground. It is, however, interesting in showing us to what depths official architecture has sunk in the States. But good may come of it, seeing that it has apparently sounded the death-knell of the system, as a Bill is now before Congress which will cause all public buildings to be thrown open to competition. The building is rectangular in plan, and measures 350 ft. by 420 ft. In the centre is placed a dome 120 ft. in diameter and 150 ft. in height, constructed of steel and supported on sixteen columns. The space below the dome gives access to all the principal galleries, whose main axes run north and south. The main entrances are on the long façades, while square pavilions with pyramidal shaped roofs occur at each angle. The exterior is in a very coarse type of Renaissance, which is hardly worth criticising, so poor and meaningless is it in design and commonplace in general conception.

The dome rises in the centre, and though not absolutely bad in general proportion, the detail is singularly so, and the black colouring of the panels between the ribs does not help it. Probably the worst part is the "ornamentation" to the interior of the dome, in which sprawling cupids, flowers, fruits, and national trophies are mixed together without any regard to colour, treatment, or suitability, and making it altogether one of the most vulgar attempts at decoration it is possible to imagine.

The Fisheries Building, reached by a small bridge over the canal to the north, is by Mr. Henry Ives Cobb, of Chicago, and consists of a large central structure with two smaller polygonal buildings covered with pyramidal roofs and connected with it on either side by arcades. The extreme length is 1,100 ft. by 200 ft.

In the centre of the main building is a rotunda 60 ft. in diameter. The exterior is interesting, in that Mr. Cobb has exerted his ingenuity in arranging innumerable forms of capitals, brackets, &c., in which, while the general form has been kept on Romanesque lines, fishes and sea forms generally have been worked into the designs. "Staff" lends itself very favourably to this intricate form of modelling. The roofs are covered with red Spanish tiling, which contrasts not unfavourably with the toned colouring on the walls.

The Art Building, situated still further north and fronting on to the smaller lagoon, is a very chaste piece of modern French work of the most refined and scholarly type. It is by Mr. C. B. Atwood, of Chicago, the designer in chief to the Exhibition. In plan, it consists of a central building 500 ft. by 300 ft., with a central gallery 70 ft. wide on the centre of each axis and in one height. At the point of intersection of these galleries rises a flat dome 60 ft. in diameter, springing from a low pediment on each face above the roof. At the end of each of the naves, where they abut on the façades, are grand entrance

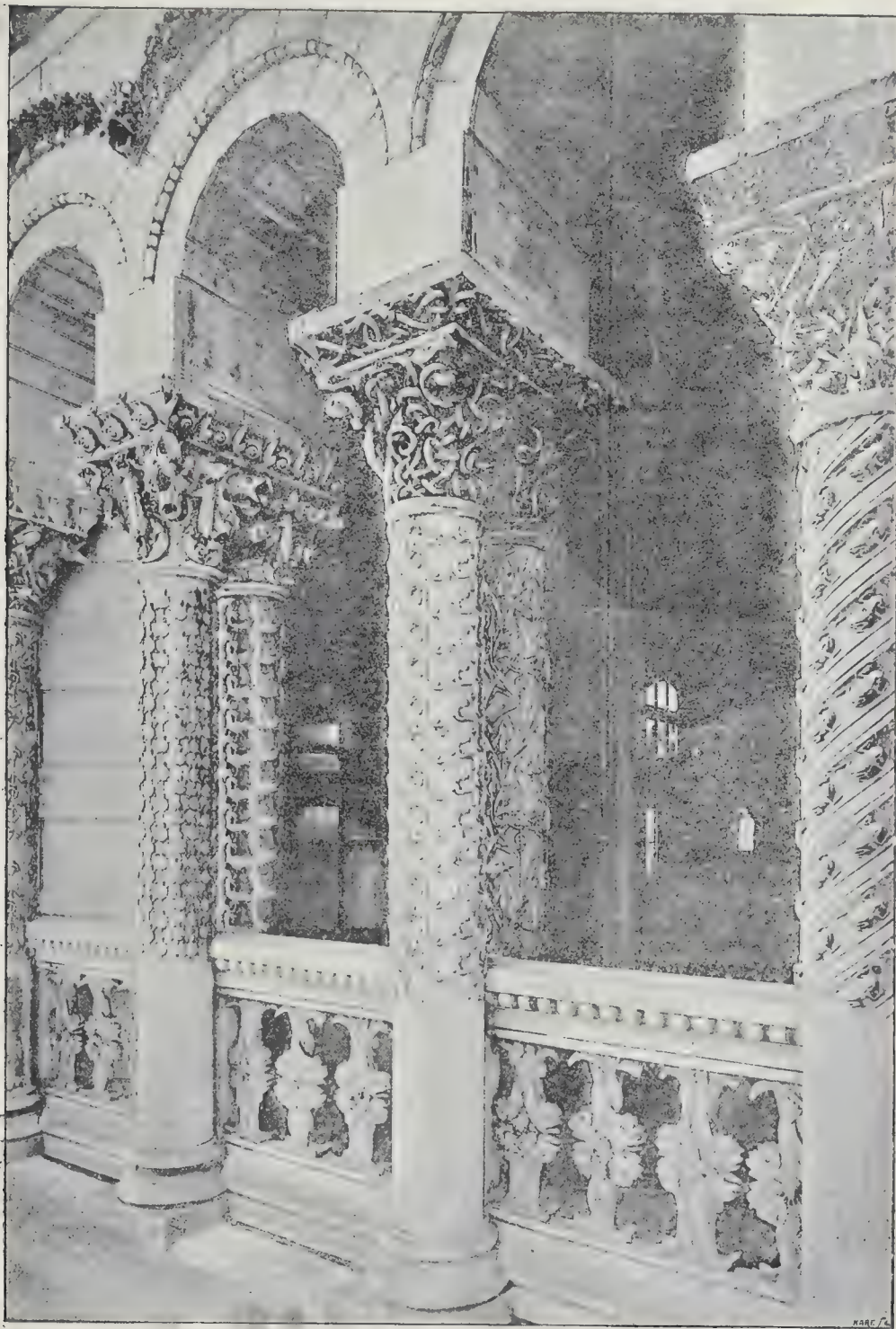
porticos of Ionic columns, and with sculptured friezes with figures and pediments, and approached by broad flights of steps. Along the façades on each side of the entrances are Ionic colonnades forming covered ways, behind which are the walls of the aitch galleries, the inner ones abutting on the central naves; these great naves are occupied with sculpture and statuary as in the last Paris Exhibition, and the inner picture galleries are entered from these naves and lighted from the top. On either side of the main building are one story annexes 200 ft. by 120 ft., which are connected with the main building by colonnaded galleries, and which project toward the north, thus forming a three-sided court towards the main front; these are treated somewhat similarly to the main building, with colonnaded entrances on two of the faces, and low central stepped dome.

The design, both as a whole and in detail, is one of the most satisfactory on the ground, but it is thoroughly French, and appears to be founded in its main features, especially the principal entrances, on a Prix de Rome design submitted by M. Bénard, in 1867. The well-known treatment of the frieze figures is here introduced, and many other distinctive similarities are noticeable. The upper parts of the walls behind the smaller colonnades to the wings have reproductions of the Parthenon frieze, harmonising well with the general Greek feeling pervading the design, and with the purpose of the building. Mr. Philip Martiny has executed the other sculpture work on the building, and his figures representing architecture, painting, and sculpture on the main frieze are very finely conceived. The building is fireproof throughout, necessitated, of course, by the costly contents. The *tout ensemble*, as seen across the lake in front, is one of the most satisfactory of modern "classic" designs that we know of.

Immediately to the north of the Horticultural Building is the Women's Building, erected from the designs of a lady-architect, Miss Sophia Hayden, of Boston, and a graduate of the Massachusetts Institute of Technology at that place. It is Renaissance in design. In plan, the main feature is the great hall, 250 ft. long and 67 ft. wide, in one height with elliptical roof and lantern light. This central hall is surrounded by a two-story structure, consisting of committee-rooms, lecture rooms, &c. Staircases are placed at each angle of the building. On the inner part of the flat roof is placed the restaurant, while the outer portion is used as a roof garden.

The elevation consists of a ground story of Ionic pilasters formed into columns, where the colonnade occurs, and an upper story of Corinthian pilasters and entablature, above which is a screen of small columns, standing above the parapet, and with caryatids interspersed, thus forming a screen for the training of creepers, as in some of the Genoese palaces. We have previously stated our opinion about this building. It appears to have been studied in an atelier, and to be a school problem. The plan is very badly laid out. The rooms surrounding the hall are dark, and the general scheme seems imperfectly studied, in marked contrast to the other buildings, while the exterior seems a meaningless array of columns and pilasters, with very little reference to proportion or composition.

CAMBRIDGE ANTIQUARIAN SOCIETY.—The Antiquarian Society of Cambridge visited Colchester recently, and spent the day in inspecting the various objects of archaeological interest in the town. Mr. Henry Laver acted as conductor of the party, which numbered about thirty. On reaching Colchester in the morning the visitors were driven to the Castle, and after inspecting that building and its contents, they went on to visit the Balkan Gate and the old wall on Balkeine Hill. Through the kindness of Mr. Geo. Joslin, the party then had the opportunity of viewing the "Joslin Museum," and thence proceeded to visit St. John's Abbey, St. Giles Church (to see the Lucas and Leslie monumental slab), and St. Botolph Priory, and after partaking of tea at the Cups Hotel they returned to Cambridge.



Detail of Fisheries Building, Chicago Exhibition.

NOTES.

AN extraordinary development of the coal war is taking place in South Wales this week. We recently quoted the terms of a resolution carried at a large meeting of Welsh miners, expressing their determination to loyally abide by the sliding scale of wages which had been mutually agreed upon; and there is no doubt that a large proportion of the men are still in the same mind. They have, however, been completely outwitted at a most excitable gathering this week, when the sliding scale was denounced as having a most demoralising effect upon the men, and a demand made for an immediate advance of 20 per cent. It was decided to stop work at once, and to employ force towards all dissentients. This is, of course, causing numerous collisions; and the district in question, so far from remaining clear of the struggle, is in a far more disturbed state than those in which it was deliberately undertaken. The miners who are willing to work are intimidated and attacked in a most barefaced and cowardly manner, the prime movers in this being the hauliers. It is altogether a most deplorable business, as there is an entire lack of effective organisation among the men, and it is acknowledged by those most friendly to them that their action is indefensible. Indeed, there is but little doubt that it is entirely illegal as well as reprehensible—even apart from the intimidation which is being practised—and as the strike has been entered upon in direct opposition to the counsels of the leaders, it is difficult to imagine what course events will now take.

THERE is now in the upper gallery of the Indian section at South Kensington Museum the magnificent Holy Carpet, formerly in the Mosque of Ardebil, in Persia. It has recently been acquired for the museum with the assistance of private individuals, the sum at the disposal of the authorities not having been sufficient for the purchase. Apart from its beautiful design and colour it is more than ordinarily valuable on account of its being a dated example. It measures 34 ft. 6 in. in length, and 17 ft. 6 in. in breadth. The central portion of the carpet has a dark blue groundwork, with an elaborate network of floral devices, chiefly in red and yellow. In the centre is a large circular ornament or medallion with light blue and red pattern on a cream-coloured ground. From this radiate sixteen cartouches of various colours, those in line with the main axes of the carpet being green, while the intermediate ones are yellow, with a red border, and red with a yellow border. A quarter of this central device is repeated in each corner of the carpet, while from two of the cartouches are representations of lamps. At the top end of the carpet is a panel of light cream colour, with the inscription in black lettering, the following being a translation:—"I have no refuge in the world other than thy threshold. My head has no protection other than this porchway. The work of the slave of this holy place, Maksoud of Kashan, in the year 942." This date corresponds with A.D. 1535 of our reckoning. The border of the carpet is about 3 ft. in width, consisting of three parts; in the centre a broad band with octofol cartouches, alternately of circular and oblong form, green and red in colour respectively, on what was once probably a black ground, now faded to a greenish brown. This broad band is flanked on the outer side with a narrower band of light red or brown with green ornament, and on the inner side with a band of similar width of light yellow or cream, with red ornament and a still smaller band of red with blue ornament. The carpet has in places become a good deal faded, but this variety in the colour gives an additional beauty to the whole. Mr. Edward Stebbing has recently published a book in which this carpet is fully described and illustrated, with coloured plates drawn to scale.

TO libel a rival in trade, in other words, to issue false statements about his business, is a thing to be put down with a strong hand, and it is to be regretted that in these days unscrupulous persons may make such statements with comparative impunity until the libelled person seeks the protection of the law. Last week, at the Liverpool Assizes, Milner's Safe Company, Limited, brought an action for libel against a Mr. Radcliffe, a rival in the business of safe manufacturers, for an issue of a circular in which various imputations were made on this company in regard to its management, manufactures, and solvency. When the case came into court, Mr. Radcliffe, through his counsel (as reported in the Liverpool papers), "unreservedly withdrew the statements, and regretted that they had been made." In other words, this person appears to have made false statements and only withdrew them when face to face with a judge and jury. Such a manner of competing in trade is a disgrace to English business men; a limited company of long standing and high position can withstand such attacks better than a single individual, and, probably, these particular attacks will recoil on the person who made them. But the fact that such attacks are made shows how a desire of gain takes away the moral sense even in respectable persons. The trade libeller is not a whit better than the burglar or the pickpocket: each seeks to obtain money by unlawful means.

TWO other assize cases which have just been heard also deserve to be noted. At Bristol a tenant recovered substantial damages from a landlord as compensation for loss of health through defective drains. It was admitted that the landlord was bound to keep the drains in a proper state of repair, and that sewer gas got into the house. But it was contended that the gas came from the main sewer, and not from the house drains, but the jury found against the landlord. But it is surprising that it should have required an expensive litigation to arrive at a result which a competent surveyor should have been able to state to the parties. In the other case an architect has obtained damages from the Midland Railway Company for injuries sustained through the defective lighting of this company's station at Swansea. We are glad to find that the plaintiff was successful: railway companies light many of their stations very imperfectly. We do not say that they should use the electric light, but the lamps might be better constructed, have reflectors to throw the light down, and be more powerful. That more persons are not injured at railway stations is the result of their caution, and not of any good lighting by the companies.

THE case of Hill & Co. v. Thomas, heard on appeal before the Master of the Rolls and Lord Justices Bowen and Kay, is one, the bearings of which are of some importance to contractors. The plaintiffs are contractors who were engaged in constructing a battery for the Government at Angle Bay, Pembrokeshire, and in the course of this work they carried over the highway known as Angle-road, 8,500 tons of shingle and cement, in 9,000 loads; a traffic which naturally cut up the road seriously. The Surveyor of the Highway Board, according to the *Times* report of the case, preferred a complaint against the contractors under section 23 of the Highways and Locomotives Act, 1878, and the justices before whom the complaint was brought ordered the contractors to pay the cost of the extra repairs necessary to the road, amounting to 105l. Messrs. Hill & Co. appealed, and the Divisional Court reversed the decision of the justices on the ground that there was no proof of excessive weights being carried over the road at one time, only of an unusual amount of traffic. The Surveyor by leave appealed, and the Court of Appeal confirmed the

original decision of the justices on grounds stated in a long judgment delivered by Lord Justice Bowen. The main ground of the decision rested on the fact that the object of the section was not to prohibit excessive traffic but to place the extra cost incurred by such traffic on the right shoulders; and secondly, that the section distinguishes between "excessive weight" and "extraordinary traffic," and that therefore the damage done by "extraordinary traffic" may be considered apart from that due to excessive weight. And the Court of Appeal held that "extraordinary traffic" must be defined in relation to the usual and ordinary traffic on the road. It being admitted that the amount of use of the road by the plaintiffs was greatly in excess of the usual traffic, and the wear and tear of the road and the consequent extra expenses of maintenance were entirely due to this extra amount of traffic carried over it by the plaintiffs, the case came under the definition of "extraordinary traffic" as contemplated by the section, and the original decision of the justices was accordingly confirmed. It is therefore obvious that contractors who have to carry the materials for a large contract over a country mostly used only for a comparatively limited amount of traffic must expect to be rendered liable for any extra repairs rendered necessary by their traffic, and will do well to take this into account as a contingent expense.

THE combination of metal and cement, or concrete, for structural purposes is finding wider application day by day. The full-size model of the Eddystone Lighthouse at the Naval Exhibition was a notable example in this country. There, it will be remembered, a "skin" composed of expanded metal sheeting forming, as it were, a metallic trellis-work, was embedded in cement concrete, the whole being supported by an iron skeleton. In America some quite important buildings are being constructed of concrete, in which are embedded iron rods, for the purpose of supplying the necessary tensile strength, and in this way large floor spans are obtained without undue thickness of material. The museum building of the Stanford University in California is one of the latest examples of monolithic construction, in which the concrete is strengthened by iron rods on what is known as the Ransome system. We recently described a plan of constructing water-pipes and reservoirs, framed much on the same lines; and the principle is now receiving further development by its application to such important structures as highway bridges. The "Monier" system, to which we refer, consists essentially of two arches of wire netting, one superposed upon the other. The space between these two spans is filled with concrete, and the metal work therefore represents the intrados and extrados of an arch. Frequently but one arch of netting is used, naturally that forming the intrados. A foreign contemporary illustrates some applications of the system. A highway bridge over the Nador Canal, at Sarbogard, Hungary, has an arch of 50 ft. span, the rise being about 7 ft., and the thickness of the crown is close on 8 in. In another highway bridge, in Germany, the span is 65 ft. 6 in., and the rise 8 ft. 3 in., while the thickness of the crown at the arch is just on 8 in. A still more striking bridge in appearance is a foot-bridge, of 115 ft. span, and having a rise of 13 ft., the uniform thickness throughout being just under four inches. The same system is being applied in Hamburg to the construction of sewers.

FROM some correspondence that has just passed between Mr. G. Shaw Lefevre, M.P., and Mr. Hood Barrs, L.C.C., it seems that in the course of next week the Albert Palace and its contents, including the great organ, will be sold by the Office of Works, proceeding under their distress for arrears of rent, which in October last amounted to 2,250l. The Board then agreed to postpone further

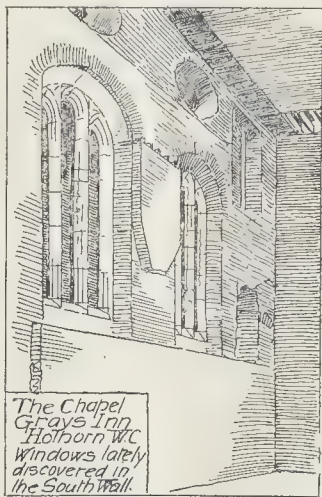
measures for vacating the lease, and to accept a conditional offer of 20,000*l.* for their interest in the land and remaining property; but, so far, no agreement has been arrived at between the Acquisition Committee and those who are interested in the Board's lease. The Palace and grounds, covering over ten acres, and on which it is said more than 100,000*l.* has been expended, was opened in June, 1885, having been erected after the designs of Messrs. F. & H. Francis. At the projected sale by auction on April 27 of last year, with an upset price of 5,000*l.*, no bid was made. The organ, which has formed a nesting-place for sparrows of late, was built by Messrs. Bryceson Bros., under the directions of Mr. T. W. Best, and was sold to the Palace some years ago by Mr. Holmes, of Regent's Park. It is a noble instrument, having its stops and four key-boards separated from the main body, and so placed that the organist faces the area of the concert hall. In a letter addressed to a daily contemporary, Mr. Hood Barrs writes that the County Council make the acquisition of the organ a *sine qua non* of their taking over the Palace as a place of public resort, that the Battersea Vestry has promised 5,000*l.*, and Mr. Passmore Edwards offers, he believes, 15,000*l.* towards a sum of 26,000*l.* for purchasing the Palace, organ, and fittings, and putting them into good repair. We understand that in the building were used the stone materials of the King's Bench Record Office (behind which Soane built the old Law Courts, Westminster Hall), originally erected by Kent (some say that Ripley helped him) for the Commons Committee Rooms, and pulled down in 1883.

WHAT is the duty of a landlord of a building, which is let in flats or as offices, in regard to keeping the staircases in repair? The answer is to be found in a case recently decided by the Court of Appeal, *Miller v. Handcock*. The plaintiff, who had to visit a tenant of one of the large blocks of buildings so common in the City, fell down the stairs and was seriously injured, owing to the defective condition of a staircase, and he accordingly sued the landlord for damages, which it was held he was entitled to recover. "It seems to me," said Lord Esher, "that there is an implied obligation on the part of the landlord to the tenants to afford a reasonably safe entrance and exit, or else he is letting to the tenants that which will be of no value to them. What is the use of a second floor to any one if the staircase, by which alone there can be access to it, is to be allowed to go to ruin?" Obviously it would be contrary to common sense to say that a landlord is not bound to keep the stairs in proper repair. We are only surprised that it should have been necessary to go to the Court of Appeal for an answer.

THE *Quarterly Journal of the Geological Society*, just issued, contains a suggestive paper by Mr. Frank Rutley, F.G.S., "On the Dwindling and Disappearance of Limestones," a subject having direct bearing on the causes of variation in quality and structure of many freestones, although the author does not deal with it in that connexion. He remarks that there are probably few instances in nature in which limestone-beds are so protected that water cannot gain access to them. A limestone-bed to which water charged with carbonic acid gains access becomes gradually dissolved, and, furthermore, the solvent action of humus acids must also, in some cases, be taken into account. The question whether such a bed will completely vanish is one which involves merely the magnitude of the bed, the duration and energy of the solvent action, and the freedom of the limestone from foreign matter of a more or less insoluble nature. If unlimited time be conceded, there seems, he says, no reason why very thick beds of limestone should not wholly disappear—at all events,

thin ones may easily do so. There is a great deal of truth embodied in these observations, but we are unable to accept all the author's conclusions. It is perfectly right to say that limestones are wasted away underground by the action of solvent water, and we have abundant evidence in stone quarries, where the workable beds of stone alternate with more or less worthless materials, that the solvent action has caused a considerable amount of dwindling in the latter, which obviously were much thicker than they are at present. We know also in regard to the Chalk formation that it was much thicker than it now is, having been reduced to its present condition by the action of percolating water. But when we read that the process is to be applied to all limestones, and that it is only a matter of time—geological time, of course—for all such stones to disappear, we feel compelled to dissent. It goes without saying that carbonate of lime is readily decomposed by carbonic and other acids found abundantly in water, but under certain structural conditions limestone is hardly affected thereby. Indeed, the solvent action is in part reconstructive, for we know in regard to many of our most durable building freestones, that the semi-crystalline condition in which they are now found, is almost entirely due to the chemical changes wrought in them by the agency of percolating water. We are unable to follow the author in regarding the action referred to as producing very widespread effects. It undoubtedly has caused the disappearance of certain thin limestones, but, on the other hand, it has led to the more complete preservation of other kinds.

DURING the alteration and restoration, which is being carried out at the Chapel of Gray's Inn, some windows have been found in the south wall, and traces of similar ones on the north side. They are of three lights with four-centred enclosing arches deeply recessed from the inner face of the wall. At the west end of the wall a relieving



arch is shown formerly of a doorway, which stood nearly opposite to the present north-west entrance to the chapel. Over the windows are two oval ones of much later date corresponding with similar ones, also on the north side, and immediately underneath the late flat ceiling. There appears to have been a chapel founded here in 1315, in connexion with the family mansion of the De Grays, which stood here. The windows discovered belong to late Perpendicular times, when the chapel must have been entirely rebuilt, although we believe no record exists of it. In 1619, an order was made for the rebuilding of the chapel, but, doubtless,

owing to want of funds, this was not done, and it was not until 1698 that any extensive alterations were made. The main walls seem to have been left, the oval windows inserted, and the fittings generally renewed.

THE choice of St. Dunstan's-in-the-West for the proposed memorial window to Izaak Walton, is guided by the fact that he resided for some years, and served as overseer, in that parish. Admitted of the Iron-mongers' Company on November 12, 1618, he opened one of the little shops over Gresham's Bourse, Cornhill, whence he removed to Fleet-street, where, in a deed of 1624, he is described as "linen-draper," and as sharing a house with John Mason, hosier. The wood and plaster house, of temp. Edward VI., which until May, 1799, stood at the south-west corner of Chancery-lane, and, together with the "Three Squirrels" (Goslings' bank) opposite, was reproduced in Mr. G. H. Birch's "Old London" at the Health Exhibition of 1884, was commonly called Walton's. But Sir John Hawkins says his house stood two doors west of the lane, being next westwards of the "Harrow" Inn. In later years it was represented by No. 198, Fleet-street—Kennings' Masonic depot—in the block between Bell-yard and Chancery-lane pulled down, together with Apollo-court and the "Cock" tavern, in 1831-2, for the Bank of England branch-office. In 1632 Walton moved to a house by the entrance into Crown-court, west side of Chancery-lane, and then into another house three or four doors north—where now stands the London Joint Stock Bank branch-office—and opposite to which Jacob Tonson afterwards opened his first shop by sign of the "Judge's Head." This is probably the house he mentions in his will, demising an interest for sixteen years therein to his daughter and her husband, Dr. Hawkins, of Winchester. Bell-yard and Fetter-lane were once renowned for their fishing-tackle shops. In 1640 Walton edited a volume of sermons, to which he added a life, of Dr. Donne, who was vicar of St. Dunstan's, 1624-31. But it is not generally known that he was living in Clerkenwell, near Cobham-row, when his most famous work was first "Printed by T. Maxey for RICH. MARRIOT, in S. Dunstons Church-yard, Fleetstreet, 1653." Sir N. Harris Nicolas says, in his edition of "The Compleat Angler," that Walton left Chancery-lane circa August, 1644; he went, it seems, to Clerkenwell, in 1649, staying there until the end of 1661, in November of which year his name occurs for the last time as assessed to the poor's rate. Finding London, he avers, not the place for an honest man to live in, he ultimately retired to Winchester. He was buried beneath a black marble slab in the floor of Prior Silkstede's chapel, of whose screen we published on July 15 last Mr. R. M. D. Lucas's measured elevation and plan. In the National Gallery is Jacob Huysman's portrait of Walton, in his old age.

VARIOUS schemes have lately been brought forward in Bath with reference to the proposed increase in the water supply to that city. The corporation is naturally jealous of any attempt at obtaining water from deep wells, especially in the vicinity of the Grand Pump Room, as it might lead to some infringement of its rights over the hot water springs; more than one well boring has had to be abandoned by reason of that. In this connexion we may notice a valuable contribution to the literature of Somerset wells and borings from the pens of the Rev. H. H. Winwood, F.G.S., and Messrs. W. Whitaker, F.R.S., and H. B. Woodward, F.G.S., which appears in the current *Proceedings of the Bath Natural History and Antiquarian Field Club*. The first-mentioned observer in recording a deep well-boring in Bath remarks that the surface springs and shallow wells upon

which the water supply formerly depended are now found insufficient, for many reasons. This boring is on the east side of Bathwick-street, in the yard of the Bath brewery, and penetrates to the blue Lias clay. Particulars of other wells are given from near Spurway's reservoir, on the southern slope of Lansdown, also at Bedminster, Curry Rivell, Harptree, Langport, Shepton Mallet, South Widcombe, Taunton, and Wington. We note that whilst the sub-divisions of the beds passed through in sinking each well are carefully set out, the description is not always accompanied by an account of the quality and quantity of water met with. It is not sufficient to say that "water was found on breaking through this latter bed," "water was just oozing up," "supply is abundant," &c. In every case accurate details should be given as to the yield, and it should not be difficult to state the quality of the water in general terms. On looking through literature relating to wells we have noticed that these desiderata are frequently not given.

THE MONUMENT.

CONSIDERABLE alarm was felt when, on the morning of September 25, 1888, a fragment of masonry fell down from the top of the Monument. The civic authorities put up a swinging scaffolding, the entire fabric was examined, and the late City Architect took the opportunity to make measured drawings, comprising vertical and horizontal sections, on a scale of 8 ft. to one inch. Some repairs were executed, and the ornamentation of the abacus, originally fastened by iron bolts, removed. In his interesting book* Mr. Welch assures us that the result of the examination showed the remarkable strength and soundness of the column, "the stone being of splendid quality," he says; and adds: "The building is now in as good a condition as ever." We commented upon the material—Portland stone—employed, in an article in our paper of October 6, 1888, questioning the desirability of using even the best stone now quarried in the island, for public buildings in our capital. The Monument stands, and is likely to stand for many a day, a notable memorial of a great disaster, still to furnish, as it did to Dr. Johnson on the ill success of his tragedy, a smile for resolute stability.

This small volume appears opportunely when we have the recent fire at St. Mary Axe in mind. Occupying the site of St. Margaret's Church, and distant by its own height of 202 ft. from the shop of the King's baker in Pudding-lane, where the flames broke out, it overtops all similar structures as well as the spirelet that surmounts the graceful cupola and lantern of the neighbouring church of St. Magnus the Martyr. The views to be obtained from its summit are superior in some respects to those gained by ascending St. Paul's. Mr. Welch's official position as Librarian to the Corporation, combined with his well-known attainments in archaeology and historical literature, enables him to produce what should form a standard work upon its subject. Whilst compelled, by nature of the case, to rehearse many particulars already familiar, he puts all the material into an attractive form, and has been at the pains to collect a valuable stock of information upon views, bibliography, and authorities (printed and in MS.) in respect of the Monument and the Great Fire. He gives a brief account of the Fire itself, and does justice to what we are now rather prone to forget—the activity and sympathy displayed by Charles II. and his brother. And here we may mention, since we do not find it noticed, that in the last scene of his "Marriage à la Mode" Hogarth illustrates the old rule of keeping water-buckets in the aldermen's private houses. An Act of Common Council, 1667, ordained that the aldermen should equip their houses with one hand-squirt and twelve or twenty-four leather buckets apiece; and that every parish should keep in readiness two brass hand-squirts, in addition to the 800 buckets, fifty ladders, with other tools, to be provided by each of the four divisions into which they divided the City for this purpose. To supply the squirts and the City Companies' engines with water, pumps were to be placed in all wells, with fire-plugs in the mains of the New River and Thames Water Works.

Besides those formulated by Evelyn and Wren, several plans were advanced for a rebuilding of the City. In his diary, Evelyn writes:—

September 13.—I presented his Majesty with a survey of the ruins, and a plot for a new City, with a discourse on it; whereupon after dinner his Majesty sent for me into the Queen's bed-chamber. Her Majesty and the Duke [of York] only being present; they examined each particular, and discours'd on them for near an hour, seeming to be extremely pleas'd with what I had so early thought on.

In a letter to Sir Samuel Tuke, dated at Sayes Court, September 27, Evelyn says:—

The King and Parliament are now busied with adjusting the claims of each proprietor, that so they may dispose things for ye building after the noblest model. Every body brings in his idea, amongst the rest I presented his Majesty my owne conceptions, with a discourse annex'd. It was the second that was seen within two [sic] days after the conflagration, but Dr. Wren had got the start of me.

Inasmuch as Wren's and Evelyn's are the best known, by name at any rate, it may not be amiss to briefly indicate the salient features of their respective schemes, premising it was due to the jealousies and apprehensions of the citizens that so signal an occasion was lost; and now—as we pointed out in reviewing Mr. Arthur Cawston's book (see pp. 23-5, *ante*)—the evil seems to be past remedy.

Wren, of whose plan Mr. Welch gives a copy, designed parallel streets crossing at right angles; the three principal, with two or three cross streets, to be at least 90 ft. wide, others 60 ft., and the lanes about 30 ft. Around the Exchange he disposes the Post, Excise, Bank, Mint, and Insurance Offices; he places piazzas at the end of London Bridge, and two others to stand square with this and the Exchange, with another about half-way up Fleet-street. The halls of the twelve chief Companies he ranges in a square about Guildhall; a quay from the Temple to the Tower is inscribed, between Bridewell Dock and Queenhithe, "the Grand Terras with the Publick Halls." The churches he fixes in conspicuous positions, and, for the most part, at street corners, but all churchyards, gardens, and unnecessary vacuities, all trades using great fires or producing noisome smells were to be placed without the City. Evelyn lays out new burial grounds along the wall between Aldgate and Cripplegate, the opposite side to form a large street for the inns, with carriers' stations, &c.; he transfers the Exchange to the Steel Yard, in an area bounded on three sides with piazzas. He proposes, moreover, to collect the various trades and professions in common centres: the College of Physicians' piazza is to consist of houses for doctors; stationers and booksellers are to have their shops, and the clergy their residences, round the piazzas of the churches; about St. Paul's are to be the episcopal palace, houses for the dean, canons, and prebendaries, the ecclesiastical offices, and a public library.

But these projects were of no avail. On September 18, 1667, an Act passed for setting up a court composed of Justices of the King's Bench and Common Pleas, and Barons of the Exchequer, who sat in Clifford's Inn Hall to adjudicate in all matters, as between landlord and tenant, arising out of the burning or demolition of property. The judges, being twenty-two in all, discharged this special duty without fee or reward during the interval 1667-73. Their decisions are contained in nine books, known as the "Fire Decrees," in the Town Clerk's custody, and Michael Wright was employed by the Corporation to paint the portraits—whole-length, for 60*l.* apiece—which formed the subject of Mr. G. B. Scharf's paper, read recently to the London Congress of the Royal Archaeological Institute (see page 65, *ante*).

Another statute demands notice in our columns. The Act 19 Car. II., c. 3 (whose 29th clause provides for the erection of the Monument itself, by a duty of 1*l.* a ton upon all coals brought into the Port of London) makes certain rules to govern all persons concerned in the rebuilding. These prescribe that there shall be only four sorts of buildings; the first, or smallest kind, in by-lanes, to be two floors high (9 ft.) besides cellars and garrets; the second, in noted streets and lanes, of three floors (10 to 9 ft.) with cellars and garrets; the third, in principal streets, of four floors (10 to 8 ft.) with balconies, besides cellars and garrets; and the fourth, for houses of leading citizens and people of quality, at the builder's discretion, to a limit of four floors. All cellars to be 6 ft. 6 in. high, the height of the garrets at the builder's discretion. All new buildings to be constructed of stone or brick; with party walls ranging from two to one brick, and

front and back walls from two-and-a-half to one brick; and to be thus erected within three years after the fire upon pain of the then vacant sites being disposed of by the Corporation.

The Act provides for the widening of certain streets, with all narrow passages less than 14 ft. wide, and for the making of new thoroughfares, including King-street, Chesepide, and Princes-street. It also ordains that the Lord Mayor should draw up tables to regulate the prices of materials and the labourers' wages; and that for the greater expedition of the work all labourers, being non-freemen, should for seven years, or longer, have the same liberty as that enjoyed by freemen, freedom for life being conferred on all who should labour for a period of seven years. This franchise is supposed to be commemorated by the figure of Liberty in Cibber's relief upon the west front. In that same year the Court of Common Council issued "rules and directions for the pitching and levelling the streets and lanes of the City," under which the slopes of many thoroughfares were altered, some being raised by as much as 7 ft. or 8 ft. We will add that the house in Monument-yard where Goldsmith lodged, 1757-8, as assistant to Jacob, the apothecary, was pulled down about ten years ago for the new approach into Lower Thames-street, designed by Colonel Haywood, engineer to the City Commission of Sewers.

THE ARCHITECTURAL ASSOCIATION: TWENTY-FOURTH ANNUAL EXCURSION.

THE head-quarters of the excursion having been fixed for this year at the quiet and small town of Diss, the members gathered in their usual fashion during the Saturday and Sunday preceding the official commencement of the week's work. Diss, although a small town, is a very pleasant centre for architectural excursions, and enables the party to gather up some of the fragments left from the Norwich, Lynn, and Bury St. Edmunds excursions. Indeed, the counties of Norfolk and Suffolk are so full of architectural interest that many tit-bits are still left unexplored, and Sunday was partly occupied by the members who had arrived in discussing the merits of places near their routes which they would like to visit, as well as in walks to spots within a short distance of the head-quarters, such as Pelgrave, with a good timber roof and picturesque situation, and Frenze, possessing as its chief merit its freedom from restoration, and hence sundry scraps of seventeenth-century woodwork, as well as some ten brasses mostly of the sixteenth-century date, and to the memory of members of the Blevherhasset family.

Monday.

The first building visited was the church of St. Andrew, South Lopham, chiefly remarkable for its very fine central Norman tower, which divides the nave, with its north and south aisles, from the chancel. The north door, now blocked up, also is a relic of the Norman church, but the main structure appears to have been erected in the Decorated period, considerable additions and modifications, including the clearstory, having been added by Perpendicular builders. Like most of the churches of the district, this shows some good examples of flint and stone panelling, and the effect of the clearstory carried out in this manner, and supplemented by occasional red bricks as borders to the arches, is very pleasing. The letters S, T, and A are worked into the panels, between windows of clearstory, as well as the constantly-recurring M.R. conjoined. An interesting point is the existence in the south wall of the chancel of a so-called leper's window, which is both larger and at a higher level than these are generally found. The form of the piscina is somewhat unusual, it having a half-arch open towards the sedilia, with plain triple-stepped stone benches without canopies. A piscina also exists in the vestry, and apparently is in its original position, though possibly it originally existed for the service of a side chapel rather than of a sacristy. Of the old woodwork of the church there remain some bench ends, now re-used for the new choir seats, introduced when the chancel was restored in 1865. The original Perpendicular roofs of the nave and aisles also remain, though not elaborate in design, and there are indications, in the mortice holes for the main sill, of a chancel screen having formerly existed, though all other trace of it has vanished. The nave and aisles of the church were restored and reset in 1874.

From South Lopham the party proceeded through North Lopham, in which parish, by the way, both the Waveney and Little Ouse take their rise about three yards from each other, and

* "History of the Monument." By Charles Welch, F.S.A. Published under the authority of the City Lands Committee of the Corporation of the City of London; 1893.

diverging, pursue their opposite courses. Then along the charming avenue of Quidenham-lane to Quidenham itself, whose church, dedicated to St. Andrew, looks very picturesque with its western steeply, made up of a circular tower with octagonal belfry stage and shingled spire. The greater part of the church is of Early English date, with a Norman south porch and north door. The latter has some interesting old ironwork of the strapping and tracing period of English smithery, but the woodwork of the door has evidently been renewed. In the vestry wall are three pillars, which are supposed to be Saxon, and probably part of an early font. The church contains several memorials and monuments to the Earls of Albemarle and other members of the Keppel family.

From the church the party proceeded to the hall, where they were received by Lord Bury, who showed them over the house, which from some few remains and a wooden model which is preserved, was originally a house of the Stuart period, to which has been added and incorporated a Palladian residence. To the artistic mind the chief attraction of the house is not the architecture, but the pictures, particularly the pastels, and the charming old gardens.

To see an example of the type of house that Quidenham originally was, the members proceeded to Wilby Hall, the first of the series of moated halls to be seen on the excursion. The house externally is a fine subject for the painter, and interesting to the architect from its imitation of the usual detail of Early English Renaissance stone buildings, executed in red brick and covered with stucco. The mullions, transoms, heads and sills of windows, as the whole of the rest of the house, are of brick, following the treatment that would have been adopted at the same period in stone. The gables are all crenelated, as is common in this part of the country, and to a first view rather suggest Flemish influence. It is, however, no more than the logical treatment of brick coping when stone tradition is absent, and hence common to the two stone-less and brick-full districts. Some doubt has been suggested as to the position of the entrance to the house, from indications of a bridge over the moat, towards what is now the back elevation, but there does not appear from the evidence of the building itself to be any question that the entrance of the present house was always in the present position. The hall was built by Robert Wilton, who was born in 1599, and died November 19, 1657. The arms of two of his wives are indicated on the frieze of the front entrance; those of the third have vanished. Robert Wilton is described as a colonel, but whether a Cavalier or a Roundhead does not appear. The description of the gallant colonel as a "faithful patriot and true lover of his country" was true of many on both sides. He was probably, however, a Parliamentarian, as that was the prevailing sentiment of this part of the country.

The church at Wilby, dedicated to All Saints, has some fine Decorated tracery in the windows, and, like most of its neighbours, a good tower. It is unrestored, and hence refreshing, with its scraps of woodwork of various dates, a pulpit of the seventeenth century, with the usual trestle head, altar, rail and table, benches, and so on. The piscina in chancel is noticeable for the excellent carving of the sink, and evidently belongs to the Early English period of the church. The font has some interesting detail of Decorated date.

From Wilby the party returned by way of New Buckenham, which, though of considerably less size than it once was, has an air of importance that its present fortunes do not maintain.

It might be suggested that the distinctive prefix has lost somewhat of its suitability, as New Buckenham received its name when founded by William d'Albini, Earl of Chichester, in the reign of Henry II. The reason of the foundation is said to be that d'Albini disliked the situation of the castle, built about the time of the Conquest, at Old Buckenham, and so pulled it down and built another at New Buckenham, which is said to have consisted of a keep, two round towers, a grand entrance tower, and a barbican, and to have been enclosed with surrounding walls and fosse. The owner, who had view of frankpledge and the power of life and death, obtained from Henry II. many privileges for his new burgh, among which were those of holding a mercate court, the assize of bread and ale, and a market. The inhabitants had the privilege of exposing goods for sale at any market or fair in the kingdom, free of toll or stallage, while the lords of the manor claimed the right of officiating as butler at the coronation of the Kings of England. To compensate old Buckenham, as it were, for

the loss of his own presence, d'Albini founded at that place of ancient importance a priory of Augustine canons, in honour of St. James the Apostle, using partly the materials of the old castle for building the new church and monastery. At the dissolution, the establishment consisted of a prior and eight canons, whose revenue was estimated at 1317. 11s.

The Church of St. Martin, at New Buckenham, is wholly of Late Perpendicular work, and a very fine example of the period, consisting of chancel, clearstoried nave of five bays, north and south aisles, south porch, and western tower. The interior was restored and reseated at the expense of the late John Gall, Esq., J.P., in 1879, but the exterior seemed to have more attraction for the visitors. This is hardly to be wondered at, as the tower and the south porch were, either of them, amply sufficient to fill the time at disposal. Both general design and detail were excellently worthy of study, the flint and stone panelling being more than usually rich and admirable in design. It is curious to note that we have here an example of the disfavour with which the north side of a church was regarded by our forefathers in that while the remaining sides, east, south, and west, are richly panelled, the north is left bare and cold.

There is a good tomb on the north side of the chancel. The font is of a type frequent in Norfolk, with lions (or leopards) sejant on the faces of the drum. The rood-screen has entirely vanished, and only the stair remains on the north side of chancel as evidence of its existence. From the date and size of the church it must have been a very fine example.

In the market place is a picturesque market cross or hall of small size, with the old pillory still remaining. Some very fine carvings of Perpendicular date are clearly fragments of an older building.

With New Buckenham ended the first day's work, though in a county so plentifully strewn with churches as Norfolk, those visited were by no means the only ones seen.

Tuesday.

Still confining themselves to Norfolk, the excursionists started this day from Diss in an easterly direction to Scole, or Osmondston, where the chief attraction is the old inn built in the seventeenth century by John Peck, a merchant of Norwich, in 1655, at a cost of 1,500*l.*, and a notable stopping place on the great high road from Ipswich to Norwich. The house, as shown by old drawings, is now somewhat shorn of its most prominent feature, the great sign which spanned the road as a sort of triumphal arch, and had upon it a vivid representation of the story of Actæon. This was erected by one Fairchild at a cost of 1,057*l.* Besides this remarkable structure the house also had a portico and a rich timber porch, both of which have also vanished. Divested as it is of these salient features, the building is still a remarkable one, with its five brick gables towards the road, its highly picturesque east gable with its niche and figure of Hope, and its picturesque front towards the stable-yard with three projecting bays. As an example of the type of building erected at the middle of the seventeenth century, and of the clever use of brickwork, there are few examples of greater interest. The principal staircase is a remarkably solid construction, and with its massive newels, balusters, and handrails, well worthy of careful study.

From Scole the party proceeded to Redenhall, the church, which now serves the flourishing town of Harleston.

Redenhall Church, dedicated to St. Mary, is a magnificent example of Late Perpendicular work, superadded to an earlier church of thirteenth-century date, of which the nave arcade of five bays is the principal remnant. The church consists of chancel, with north aisle, nave and aisles, north porch and western tower, which is one of the loftiest and richest in the county. The sanctus bellcot over the chancel arch still remains. The church was restored and reseated in 1858, and is, accordingly, somewhat cold and cheerless internally, despite the large windows and ample light. Here, again, as at South Lopham, there remains a piscina in the vestry, and, curiously enough, none in the chancel, although the sedilia exist without canopies however. A piscina of Decorated date exists in the south aisle. Some remarkably fine linen panels are to be seen on the doors and the roofs of nave and aisles, one of the original Perpendicular time. An excellent brass lectern of seventeenth-century work is still in use, the eagle being double-headed. The cognisance of a double-headed eagle is also to be seen on one of the corbels of

the nave roof. The rood-screen has vanished, but the painted panels, formerly in the lower portion, are still preserved in the vestry, which originally had an upper floor, and which also contains some good specimens of furniture, chairs, chests, &c. A curious little feature on the west doors is the carving of horse-shoes, pincers, and hammer, worked in with the linen panels. The north porch has an excellent vaulted ceiling and a chamber above, approached by a circular stair from the church. It is one of the best of the many excellent pieces of design in the church. The tower has on the north face the figures, in iron, 1616, but this is only a subsequent tying-up, necessitated by the effects of lightning. The font is octagonal, of a common Norfolk type, with emblems of the four Evangelists and of the Passion, the latter borne on shields by angels in alternate panels. The shaft has the lions sejant so usually found. The rebuilding of the church in the fourteenth century was due to Thomas Plantagenet, surnamed "de Brotherton," eldest son of Edward I. and Earl of Norfolk.

After luncheon at Harleston, the next visit was made to the church of Pulham St. Mary the Virgin, which has been restored in 1886 by Mr. T. Garner, who has recoloured the screen, a fine example of East Anglian type, with the double plane of tracery so frequently found in this part of the country. The chancel has been painted and decorated and a new organ inserted. Though the church is for the most part of Late Perpendicular date, an Early Decorated window in the south aisle, and some windows in the chancel of Transitional character from Decorated to Perpendicular work, evidence the existence of an earlier structure. A large number of Perpendicular carved bench ends remain, though they appear to be now affixed to seats and backs of a somewhat later date. The priest's door and the double piscina in the chancel are of Early English work. There are some interesting remains of ancient glass of the date 1380, and others of about 1420. The richest piece of work in the building is the south porch, which is one of the finest of the many excellent examples in the county, and this, notwithstanding that the church is compared with many others of smaller size, consisting of a south aisle only, besides the nave and chancel, and the usual western tower. A group-photograph of the party was taken in front of the beautiful porch by the honorary amateur photographer, Mr. J. L. Robinson, R.H.A.

From this church to that of Pulham St. Mary Magdalen is only a short drive, and the time did not allow of a sufficient fresh stock of enthusiasm to gather in the hearts of the visitors for a proper appreciation of this church, which, except in the one point of size, suffers greatly in comparison with its neighbour. The restoration and the coloured decoration, which latter is also supposed to be a restoration, were not by Mr. Garner, and succeeded in dissipating the small amount of energy left in the party. The church has, nevertheless, many points of interest, with its north and south aisles divided from the nave by arcades of different date and design. The work is of course mainly Perpendicular, though there are substantial remains of thirteenth-century date. The western tower is a large one, and the porch, which is here on the north by reason probably of the village being on that side of the church, is an excellent example, though by no means equal in richness to that at Pulham St. Mary the Virgin. In the ordinary parlance of the parish of Pulham St. Mary Magdalen, and Pulham Market Hall which was not visited, a former seat of a junior branch of the Percies, is in the parish.

On the return journey, a stop was made at Thelveton Hall, but the heat of the day had by this time dissipated almost entirely the energy of the party, and the request of the owner that no illustrations of his house should be published, furnished an excuse for laziness which was almost universal. Everyone, therefore, welcomed the announcement of Mr. Robinson that he would take another group-photograph, which he accordingly did.

Thelveton Hall is a red brick Jacobean manor-house of the usual E plan, with the porch and entrance in the centre. This house is only one room deep, and as in some other instances the windows were originally apparently only on the north side, the fireplaces being on the south wall. Externally these are carried up with some simple but satisfactory chimney stacks. In the interior, besides the plan, there is little of interest, but a fine carved chimney-piece in the dining-room and some good examples of furniture, including a

remarkable carved oak sideboard. The entrance front is a very pleasing composition, with its projecting wings and centre, their gables crowned with crows-steps and ornamented at the quoins with elaborate cut brick pinnacles, and the mullioned and transomed windows and semicircular headed doorway. The party had here a chance of judging to some extent the effect when new of the style of work seen in a dilapidated condition at Wilby. The stucco, with which the windows and other features had their brick transmuted into the semblance of stone, has been restored and renewed, and although the modern plasterer's work is not identical with that of his predecessor in the seventeenth century, either in tint or texture, and although too the bricks have deepened in tone and taken on variations of colouring, nevertheless a fair opportunity of estimating the original value of the method of architectural embellishment here presented is afforded by Thelveton Hall.

The Church of St. Andrew, at Thelveton, although it contains some points of interest, was not included in the programme, and its exclusion was justified by the listless state of the excursionists at the Hall, whose chief consideration seemed to be the lack of accommodation within a short distance for their afternoon tea. It seems that a new and somewhat difficult duty is expected from the compilers of the programme—the arrangement of the time-table with reference to the tea-table. The exceptional heat of the first two days of the excursion was, it must be allowed, some excuse for the collapse of enthusiasm. The bright, warm, sunshiny weather is very enjoyable, but the very intensity of the enjoyment produces early symptoms of laziness and fatigue. The return to Diss was made rather before programme time, whereat grumbled the lazy ones who had spent their time at Thelveton in lolling on the lawn. Such is the contrariety of human nature.

We will continue our account of the excursion next week, with additional illustrations.

THE INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

We continue our special report of the annual meeting of this Association, recently held at West Bromwich. (See *Builder* for July 22 (p. 65) and August 5 (p. 101).

Municipal Electricity Works.

Mr. Robert Hammond, M.I.E.E., read a paper on "Municipal Electricity Works," prefaced by some notes on the history of the establishment of the electricity supply industry in this country. He said that up to the year 1879 very little electric lighting of any kind was done in the United Kingdom, but the introduction in that year of a new arc dynamo—which was a sound engineering job, and which could run for long spells without breaking down—caused quite an outburst of activity. The result was that almost all large works which were in operation by night, as well as by day, adopted electric lighting. In some, the electricity was "generated" at a centre for distribution over a large area, and thus the idea of central stations became familiar. Public lighting was started in the metropolis and elsewhere, but in the early eighties, there was no "private lighting" to bear its share of the standing charges, and the public lighting contracts, being taken at a loss for the sake of advertisement, were, in almost every case, not renewed on their expiry. In three places in England, however, Brighton, Eastbourne, and Hastings, public-spirited and plucky individuals kept the central stations at work, and, adopting the rough means then available for running incandescent lamps on arc circuits, gave the customers the choice of arc or incandescent lighting, and, by the actual experience of years, exemplified the ease with which incandescent electric lighting over an extended area from one centre could be accomplished. At Brighton, from the beginning, the supply was by means of overhead wires; but at Eastbourne and Hastings the distribution from the very first was effected by means of underground mains. The companies established in these places were followed by others formed by private enterprise at Liverpool, Sheffield, Bournemouth, and Bath, in the provinces, and at the Grosvenor Gallery and Kensington in the metropolis. On the passage of the Electric Lighting Act of 1882, fourteen local authorities obtained provisional orders, but until 1889 not one of them was put into force. In that year the first municipal

electricity works were opened at Bradford, and these proving successful, municipal electricity works are now in operation in nine places, embracing districts so widely different as St. Pancras, Dublin, Brighton (undertaken in order to prevent a local electricity company from getting a provisional order), Hull, Nelson, and Glasgow. After giving a great deal of information in a tabulated form as to electricity works (holding statutory powers) in actual operation in the United Kingdom, and as to works in course of construction, decided upon, or projected, he proceeded to discuss the municipal aspect of the question. He said he would not embark upon a discussion as to the advisability of municipal trading. That subject had been thoroughly threshed out in connexion with water and gas supply; and it is now universally acknowledged that local authorities can with propriety become the distributors of these two commodities. Pure water is the prime necessary of human life, and though this cannot be said of gas, with regard to both it may be urged that—

(a) They are practically in demand by the whole body of ratepayers. (b) They are supplied, in any particular locality, to all consumers alike, whether rich or poor, in one uniform quality. Let us apply these tests to electricity supply.

(a) The demand may certainly be regarded as universal, the only limit to it being the question of price. (b) The supply to every ratepayer, as in the case of water and gas, is bound to be uniform in quality. In the case of both water and gas supply the undertakings have, almost universally, been started by private enterprise, and subsequently assured successes. Is there anything connected with electricity supply that should make such a course inadvisable. Let us first consider to what extent, if any, the ratepayers are prejudiced by the operations of a Company. If a Local Authority sanction a Provisional Order on behalf of a company, the first step of the company is to select a compulsory area, limited in extent, but comprising the choicest portion of the town from the electric lighting point of view. Ratepayers inside this area are able, by the use of the electric light, to make their places of business more attractive, to the detriment, probably, of the ratepayers outside, who cannot demand a supply for two years, and can then only obtain it under onerous conditions of guarantee, &c. How does this arrangement appeal to the Town Authorities, who are the guardians of the interests of the whole of the ratepayers and not of a select few? Presuming that a fair case can be made out for electricity supply from the commercial point of view, it should surely be the aim of a Local Authority to establish works in connexion with which a supply is placed at the disposal of the whole of the ratepayers. No company, however, would accept so onerous a condition as making the whole city or borough the compulsory area; whereas, in the case of the Local Authority being the undertaker under the Electric Lighting Acts, the whole city or borough practically becomes the compulsory area. It may, however, be urged that if a profitable demand present itself outside a company's compulsory area the company will, as a mere matter of business, extend its mains and enlarge its works. But in the hands of a company the growth of the undertaking must necessarily be slow. The shareholders, believing in quick returns, insist upon immediate and good dividends as the precursor to any enlargement of the capital.

The business is, therefore, often cramped for capital from the beginning, and the unfortunate ratepayers in the "outside area" are left in the lurch. A municipality can afford to take wider views. If the business be in itself sound, its aim is to develop it on an extended basis as rapidly as possible. A Local Authority can afford to make "capital extensions" without waiting for a 5 per cent. or 6 per cent. return upon the work in the compulsory area; its principal aim being, with due regard to permanent profitable results, to extend the benefit of electricity supply throughout the whole of the district under its control. Again, it is obvious that the quickest way of developing the business is to offer the supply at a cheap rate. Bradford, for instance, is charging 5d. per unit, equivalent to 2s. 6d. to 3s. per thousand feet of gas; St. Pancras, 6d. for light and 3d. for motor supply; Burton-on-Trent, 6d., &c. No companies, except those at Newcastle-upon-Tyne, have ventured upon starting with such low rates of charge as this. Far-seeing directors may be fully alive to the fact that such a bold policy is the best; but they fear the criticism of the timid shareholder, who might object to lean profits in

the early stages of the business. To bring my remarks under this head to a close, I will only refer to one other municipal consideration. It is often said that in the early period of the establishment of municipal electricity works the demand will not be universal, and the works possibly conducted at a loss, and that it is unfair that the whole of the ratepayers should incur a responsibility for the benefit of a comparatively limited number. It must, however, be remembered that the introduction of electricity supply to any town raises the status of that town, and indirectly results in a benefit to the whole of the ratepayers. Large sums are constantly being voted, with scarcely a murmur, for the improvement of sanitary conditions; and the day will probably arrive when, before this very Association, a paper will be read on the iniquity of the nineteenth century in permitting the distribution, by constantly leaking pipes, under the public streets, of such a frightfully noxious thing as coal gas, and in encouraging the illumination of interiors with that which only gives out light by robbing the air of its life-giving quality, oxygen, and by returning to the air poisonous carbonic acid, to the marked lowering of the standard of health. Finally, the author dealt with the question from the commercial point of view, his conclusion being that electricity supply is based at the present stage on sound commercial lines, and that its future is all in the direction of cheaper costs. The question then for a Local Authority to decide is whether it should keep the business in its own hands or sanction its being conducted by a company. If the latter course be adopted, the Electric Lighting Acts provide for a forty-two years' tenure by the company. If an arrangement be made for an earlier purchase, it is manifest that the Local Authority will be called upon to pay a pretty heavy bonus. This, in the case of Leeds, was fixed at about 66 per cent., and in the more recent case of Reading it has been fixed at 33 per cent. It is, however, in any case manifest that the consumers are better off if supplied by the Local Authority than by a company, because the price charged by a company must cover the cost of administration by directors and also a provision of a good dividend to shareholders, whereas, in the case of supply by a Local Authority, there are no directors to pay and no fat dividends to provide. The Local Authority will easily be able to borrow the capital necessary at 3 per cent. to 3½ per cent., a rate that would hardly satisfy the shareholders in a company.

The President said they had heard so glowing an account of electric lighting as to almost make them go in for it without further consideration. But Municipal Engineers were cautious men. They knew that by waiting they had already gained largely from the experience of public companies in electric lighting; and, if they continued to wait, he thought they would still further benefit from the experience which was being gained by companies.

Mr. Cartwright (Bury) said that the paper was a very interesting and valuable one. He agreed with Mr. Hammond in saying that electric light supply should be taken up by municipal bodies, and that the areas of supply should be large: a Corporation should not provide electric light to a small central area at the expense of the ratepayers who lived in the outer districts. He had much pleasure in moving a vote of thanks to Mr. Hammond for his instructive paper.

Mr. Boulnois (Liverpool) said he cordially seconded the vote of thanks to Mr. Hammond, but at the same time he was obliged to take exception to the assumption that electric lighting, or even gas, was on a par with water. Water was a commodity of vital necessity to communities, and on that ground municipalities were justified in keeping control of it. But the same could not be said of gas or electric lighting. The latter was, as yet, only in its experimental stage, and on that ground it behoved public bodies to be very careful in their choice of plant. He thought there was too great a tendency to municipal trading in some directions.

The annual dinner of the members of the Association was held in the Masonic Hall, West Bromwich. The President (Mr. J. T. Eayrs, C.E.), presided, and was supported by the Mayor (Councillor Akrell), the Deputy-Mayor (Councillor Salter), most of the members of the Council, and Corporate officials, and most of the members of the Association attending the Conference.

Sewage Difficulties at Nuneaton.

On the following day a paper was read by Mr. J. S. Pickering, Assoc. M. Inst. C.E., Surveyor to the Nuneaton and Chilvers Coton Local

Board, on "Sewage Difficulties at Nuneaton, and how they have been solved." He said that few towns had experienced greater difficulties in dealing with their sewage than Nuneaton. Previous to the author's appointment as Engineer and Surveyor to the Local Board, three years ago, apparently disheartened by repeated failures the sanitary authority had allowed their sewage works to lapse into a perfect pestiferous morass, and it was not until a perpetual injunction restraining them from further polluting the stream was about to be enforced, that they determined at any cost to effectually treat the sewage of their district, if it were possible to do so.

Upon laying out the original scheme no suitable land within a reasonable distance of the town appears to have been available, and now, after over twenty years' development of the town, and the introduction of new industries contributing to the sewers, the sewage is of such a nature that it is questionable whether ordinary crops would not be destroyed by it.

The following extract from a long article in *Engineering* of September 11, 1874, will give some idea of the nature of the sewage to be dealt with:—

"The sewage presented some extraordinary characteristics. It was literally loaded with animal matter, appeared thick as if mixed with size, and afforded such an abominable stench of decomposed animal substances as made it impossible to conduct its analysis except in the open air. . . . The Nuneaton people are to be pitted. They have to deal with a sewage so strong that we affirm no chemical process extant can battle with it. We have tried it experimentally in its natural state with all the known processes, and all signally failed to purify it. If any of our readers desire to see a most complete instance of sewage difficulty we advise them to visit Nuneaton."

These remarks with regard to the nature of the sewage are equally appropriate to-day as they were nineteen years ago. Experts and engineers who have visited the works are unanimous in their opinion that the sewage at the outfall could scarcely be of a worse description for treatment. The dry weather flow is about 400,000 gals. per day, or 36 gals. per head per day, the population contributing to the sewers being about 11,000. Considering that scarcely one-third the houses are provided with water-closets, the quantity of sewage to be dealt with is very large; but this is due to the fact that nearly one-third the quantity is derived from factories. These consist of fell-mongers', wool-scourers', and hat factories. Those who are acquainted with the processes of these trades will understand somewhat of the description of sewage received at the outfall.

During the summer of last year the Local Board engaged Dr. Angell (public analyst for Hants) to make a series of analyses, and to report generally upon the sewage treatment. Dr. Angell occupied a full week in making his investigations, and presented a very valuable report to the Board. Referring to the sewage, he says, "it is four or five times stronger than average sewage."

Not only is the liquid sewage of an exceptional character, but the solid matter is very excessive. In designing plants for the disposal of sewage-sludge it is usual to estimate the quantity to be dealt with at from 1 to 2 tons per 1,000 population. The population contributing to the sewerage system being 11,000, basing the calculation on the highest quantity usually estimated, 22 tons should be the quantity of sludge produced per day, whereas there is actually between 57 and 58 tons per day.

The foul sewage which finds its way to the Outfall Works has to be rendered as innocuous as it is possible to make it, as, after treatment it is discharged into an extremely sluggish stream, the quantity of water flowing along which is during the summer months less than the volume of sewage effluent discharged into it. The stream, too, passes through several large estates, and four miles or so below the Outfall Works it is dammed back to form an ornamental lake close to Caldecote Hall, the residence of Captain Townshend. Under the conditions described, it will be seen that the sewage difficulties at Nuneaton are by no means imaginary.

It has been previously mentioned that treatment by land has always been considered out of the question. The method adopted, then, has, until recently, been one of purely chemical precipitation. The whole works stand on less than six acres of ground, and are within 600 yards of Nuneaton Market Place. For many years the lime process was in vogue, and after the evils of this system had become apparent, the lime and alumina process was adopted. It appears to have been entirely overlooked that the sewage itself was intensely alkaline, and the addition of further lime only added to the nuisance caused by secondary decomposition, which took place in the stream. Chemical precipitation has now been suppl-

mented by filtration through sand and "polarite," the latter being a very hard, porous, and absorptive mineral substance manufactured by the International Water and Sewage Purification Company.

The author having given a detailed description of the sewage works, which have been enlarged and remodelled by him during the last three years, described the filters, which, he said, should not be used unnecessarily in removing large quantities of matter in suspension. The filters are formed of several layers of broken stone, of sizes varying from 3 in. to pea-size, making a total depth of 12 in., over which there is a 12-in. layer of sand and "polarite" in equal quantities, and above this a 12-in. layer of coarse Leighton Buzzard sand. There are eight filters, arranged in two sets of four, and each filter has an area of 100 square yards. One set of filters is kept in use while the other set is being cleansed and allowed to rest for the purpose of reinvigoration. The cleansing of the filters is effected simply by allowing the filtered effluent from any three filters in a set to work upwards through the filter requiring to be washed. By this means the flocculent matter which collects on the surface of the filters is removed, and flows away with the small quantity of water used for cleansing, which is distributed over a small plot of land. One set of filters is washed by this means every day.

Taking into consideration the very foul sewage dealt with, the effluents discharged into the stream are excellent. In appearance they are bright and colourless, and it is only occasionally that there is a very slight—almost imperceptible—odour. The effluents invariably improve by keeping. Samples which have a slight odour when taken are practically odourless after being kept a day or two, and retain their good qualities even if kept in stoppered bottles for weeks. As gauged by the "albuminoid ammonia" test, the effluents usually show about $\frac{3}{4}$ parts per 100,000, and occasionally are reduced to between $\frac{2}{4}$ and $\frac{3}{4}$. These figures are merely rough averages from some scores of analyses which have been recently made. Although, chemically, not first-class results, the percentages of purification are very high, on account of the crude sewage being so abnormal in albuminoid ammonia.

The Commissions appointed in 1868 to inquire into the best means of preventing the pollution of rivers suggested certain fixed chemical standards for liquids discharged into streams. These suggested standards, if carried into law, would have dealt hardly with a manufacturing town like Nuneaton, notwithstanding the highly successful treatment of their sewage. It is impracticable to fix a standard applicable to all cases. What may be a comparatively easy task in a residential town may be a practical impossibility in a manufacturing town. Should, however, a standard of purity be fixed by the legislature, it must in many manufacturing towns open up the important question of the admission to the sewers of manufacturers' refuse liquors. In this respect, there is certainly room for further legislation. Apart from the difficulty of disposal of sewage, which is mixed with these waste liquors, there is the important question as to whether the general ratepayers of a district should be burdened with the expense of such disposal. It may be suggested that manufacturers are themselves heavy ratepayers and are large employers of labour. But it must not be forgotten that neither of these good offices is indulged in from philanthropic motives. It is purely from a financial motive that their businesses are carried on, and, in the author's opinion, the cost of dealing with their waste liquors should be considered as a necessary item in their working expenses. The question as to whether the sanitary authority should undertake the treatment, should be entirely a matter of arrangement between the authority and the manufacturer. Unless the manufacturer is charged for the privilege of conveying his waste liquors to the sewers, it becomes necessary to rate the district to enable him to make profits. Manufacturers, too, who happen to have no waste liquors from their manufacturing processes, or who are outside the drainage area, have to bear their proportion of the general expenses. Section 7 of the Rivers Pollution Prevention Act, 1876, compels a sanitary authority to give facilities for enabling manufacturers to carry liquids proceeding from their factories into the sewers, provided that such liquids do not "prejudicially affect such sewers, or the disposal by sale, application to land, or otherwise, of the sewage matter conveyed along such sewers, or which would, from its temperature or otherwise, be injurious in a sanitary point of view." Section 17 of the Public Health Acts Amendment Act,

1890, further prohibits the entry into the sewers of any chemical refuse or liquid at a higher temperature than 110 deg. F., "which alone, or in combination with the sewage, causes a nuisance, or is dangerous to health." Neither of these sections is very valuable to an authority whose system of sewage disposal is a purely chemical one. The question may be, as is the case at Nuneaton, merely a matter of expense at the Outfall Works.

After making careful and prolonged trials with nearly all the sewage precipitants in the market, and giving up the sewage works to the various patentees and sewage companies for trials, it is impossible at Nuneaton to get a fair tank effluent with less than thirty to forty grains of chemicals to the gallon, and even with this large quantity of chemicals added the sewage has frequently to be turned back for re-treatment. The precipitant giving the best results is a mixture of sulphate of alumina (Spence's "aluminoferric") and a special preparation of "ferozone" for deodorizing purposes. During the few holidays when the factories cease work a very good tank effluent can be obtained with from six to ten grains of chemicals per gallon, thus showing the enormous additional expenses entailed in dealing with the manufacturers' liquors.

As may be imagined, the working expenses at the sewage works are very heavy. The present expenditure is at the rate of 1,600*l.* annually, between 500*l.* and 600*l.* of which is expended in chemicals alone.

In resolving to deal with their sewage effectually the sanitary authority have placed financial considerations as quite secondary, feeling this was a matter to be considered when a good result had been obtained. They have so far been rewarded by seeing the stream, which had been polluted for twenty years, once more assume its natural appearance. During the summer of last year (before the completion of the new works) volumes of letters were received from riparian owners complaining, not without reason, of the foul condition of the stream. It was described as "a constant stream of pure sewage, of a milky white, like thick limewash, the stench being most horrible." For some time the white appearance of the stream remained a mystery. Although an enormous quantity of chemicals were being used for precipitation purposes, and no alkaline effluents were discharged, the stream presented the appearance described above. At one time there was some doubt as to whether the nuisance could be remedied, as the real cause could not be ascertained. The remedy, however, remained not so much with the Board as with the manufacturers. Their refuse liquors were discharged into the sewers without any treatment, at irregular intervals, and in varying volumes, and consequently did not mix uniformly with the ordinary sewage of the district. From Dr. Angell's report it appeared that the waste liquors from the woollscourers re-acted upon the waste liquors from the fell-mongers, and produced the white lime soaps and lime carbonate compounds, with organic flocculent matters complained of, in the river. In consequence of the intermittent and uncontrolled manner in which these liquors were allowed to pass into the sewers it was uncertain whether this unsightly chemical precipitation would take place in the sewers, in the tanks at the Outfall Works, or in the deep still pools of the river below the Sewage Works. After careful consideration it was resolved to ask the manufacturers to neutralise their refuse liquors with sulphuric acid before discharging them into the sewers, and to allow them to flow in one continuous stream during the day. The manufacturers met the Board in a fair spirit and carried out works to meet their requirements, with a result that the difficulties of disposal have been greatly diminished and the objectionable whiteness in the river has entirely disappeared.

The recent prolonged drought has been a severe test for the new Disposal Works, but no nuisance of any description has existed in the stream since their completion.

The success which has attended the efforts of the Nuneaton Sanitary Authority may be briefly attributed to the following reasons:—

1. The treatment by the manufacturers at their own works of their refuse liquors.
2. The use of sufficient and proper chemicals to effect thorough clarification.
3. The use of "polarite" filters, which remove putrefactive matters in solution, which no quantity of chemicals has been found to do by precipitation.
4. The provision of pumping machinery of



ample capacity for raising the sewage for treatment in as fresh a state as possible.

5. The arrangement for turning back the sewage for re-treatment; and

6, but by no means the least important, the determination of the sanitary authority to surmount their enormous difficulties.

There were a few other papers read at this meeting, to which we may return.

Illustrations.

OXFORD MUNICIPAL BUILDINGS.

THE illustration gives a view of the new Municipal Buildings for Oxford as the building is now being carried out, some slight modifications having been made in the design since it was accepted in competition.

We gave a description and plan of the building shortly after the competition was decided (see *Builder* for June 25, and July 9, 1892), and it is therefore unnecessary to repeat any detailed description here. The two fronts are to be faced with Clipsham stone and the roof covered with stone slates. The foundation stone was laid on July 6, and the work is now proceeding rapidly.

Mr. Chappell, of Pimlico, is the contractor; the architect is Mr. H. T. Hare; and the drawing from which the illustration is taken was exhibited in this year's Royal Academy.

HOUSE (BASED ON BRAMALL HALL).

THIS is an illustration of the entrance front of a house, the design of which is based on Bramall

Hall, Cheshire. The design was made for a gentleman who is a member of the family who owned and lived in this old house, and the idea was to design a house having a plan suitable for modern requirements with the elevation as near in design as possible to Bramall Hall.

The house will be built of brick walls where possible, faced with "half timber" work, which will be stained dark brown foiled. The roofs will be tiled.

The drawing is by the architect, Mr. R. A. Briggs, F.R.I.B.A., and was hung in this year's Royal Academy Exhibition.

ARCHITECTURAL ASSOCIATION ENCURSION: SKETCHES.

THE sketches here given were specially made by Mr. Arnold Mitchell, as reminiscences of picturesque bits in the places visited during the annual excursion of the Architectural Association, which has taken place this week. Most of them will be referred to in the articles descriptive of the excursion, in this and the following week's issue.

NIXON'S SCHOOL, OXFORD.

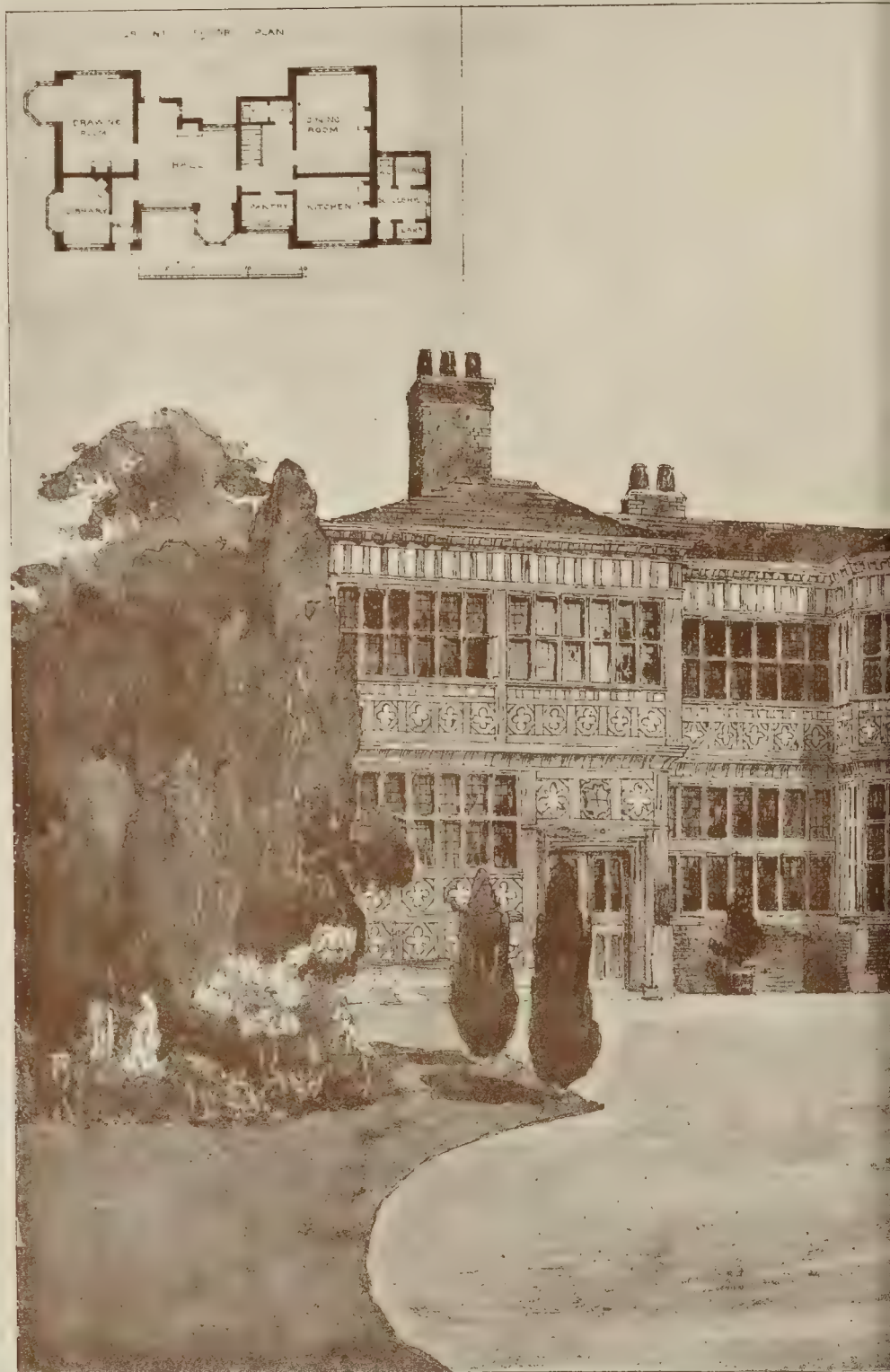
THE clearing of the site for the new Municipal Buildings at Oxford, on the east side of St. Aldate's, has included the demolition of an interesting and picturesque bit of old Oxford, known as Nixon's School. It formed the south side of a small court-yard at the rear of the site. The building was, with the exception of a doorway at the east end of the north front, entirely of wood and plaster. The ground story was arched with three depressed arches resting on circular

columns, with a slight entasis, 9 in. in diameter, at the top, and 11 in. just above the base mould. To the east was the doorway before mentioned, which was of stone, and formerly had a shield with the arms of the City of Oxford over it. This shield had disappeared when our drawing was taken. Three shields, now blank, of wood, project from the cornice over the arcade, and between them runs an inscription—"[J.] Nixon, Esq. [erected] this SCHOOL FOR GENTLEMEN'S SONS, and Endow'd it with THIRTY POUNDS annually FOR EVER." The initial J. has disappeared, and the word "erected" is very indistinct. The date of Alderman John Nixon's foundation was 1658. For some time the lower part was used in connexion with the Post Office, but for some time before its destruction it was a wood shed. The upper story had three large casement windows, with plaster gables over. The centre window projects about 2 ft. from the wall face, and had angle pilasters of good design. Over it was a wooden shield of similar character to those over the lower arcade. A window at the west end had a good cornice over. The roof was tiled.

UNIVERSITY HALL EXTENSION: EDINBURGH.

Six years ago a small residential hall for students was inaugurated in Edinburgh by Professor Patrick Geddes, with the object of combining some of the advantages of collegiate life, as existing at the English Universities, with the more practical needs and, generally, shorter purse, of the average Scottish undergraduate. The experiment has proved itself a success, the institution having steadily grown (from a small



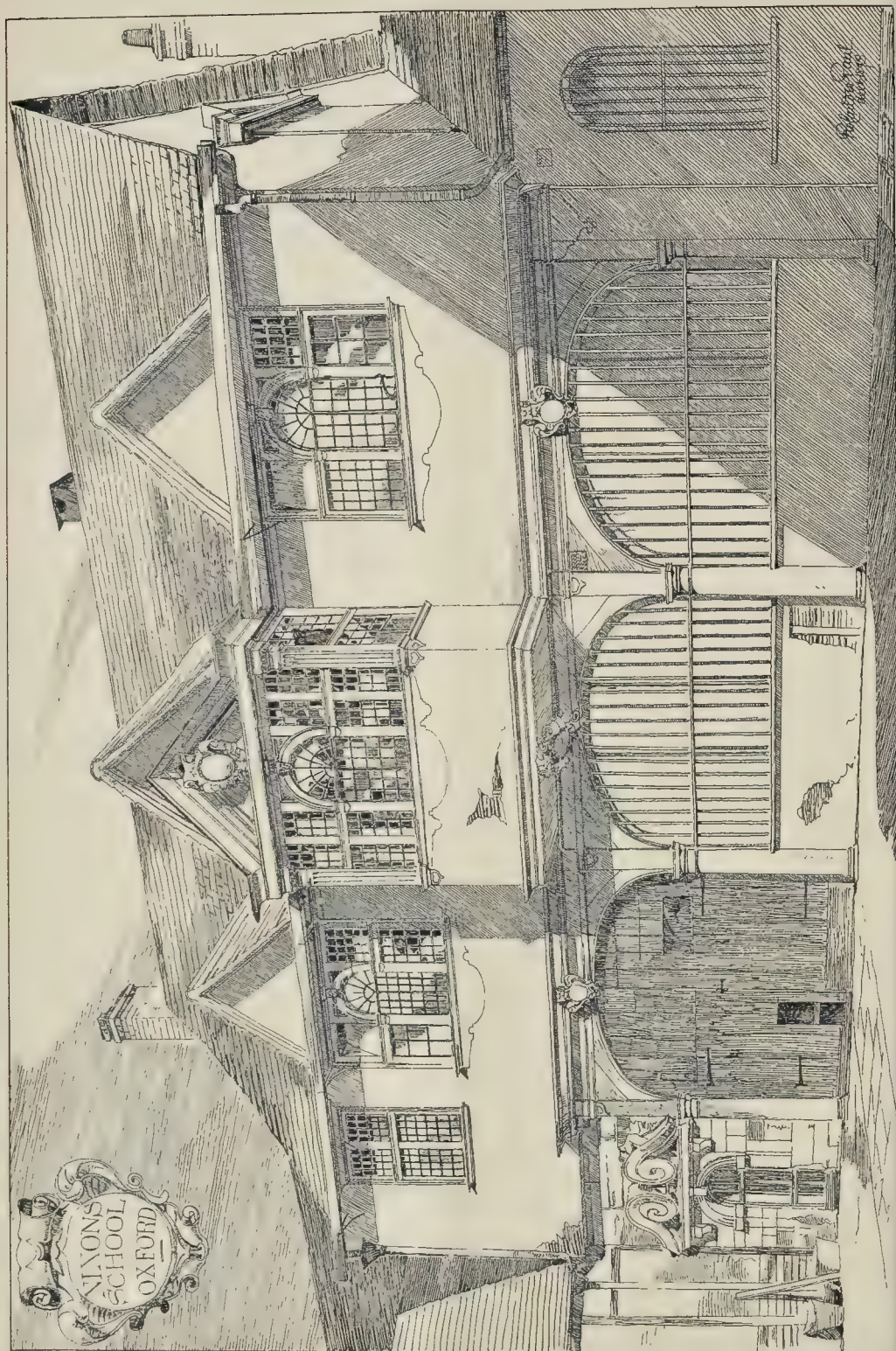


DESIGN FOR HOUSE (BASED ON BR



(L)—MR. R. A. BRIGGS, F.R.I.B.A., ARCHITECT.

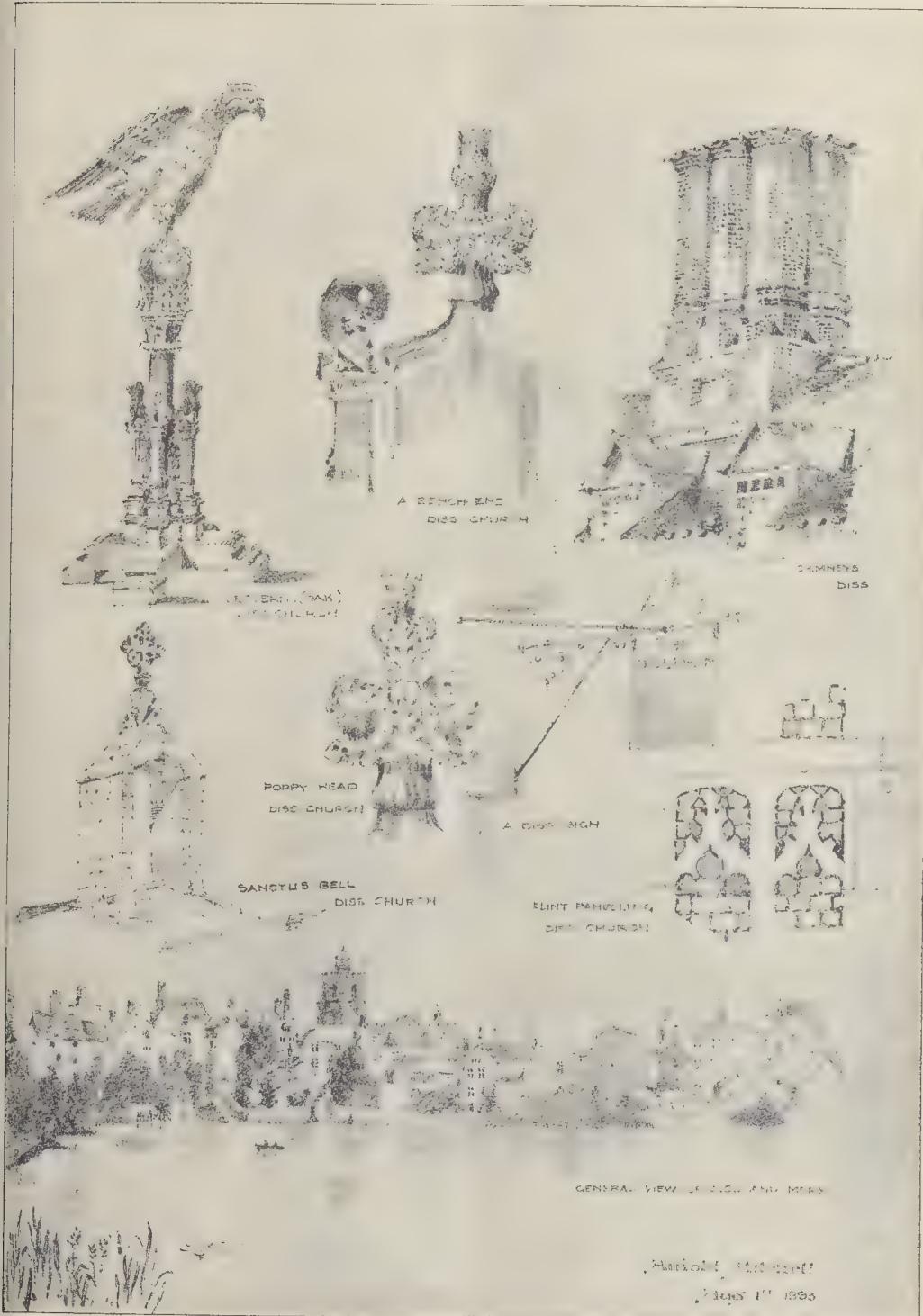




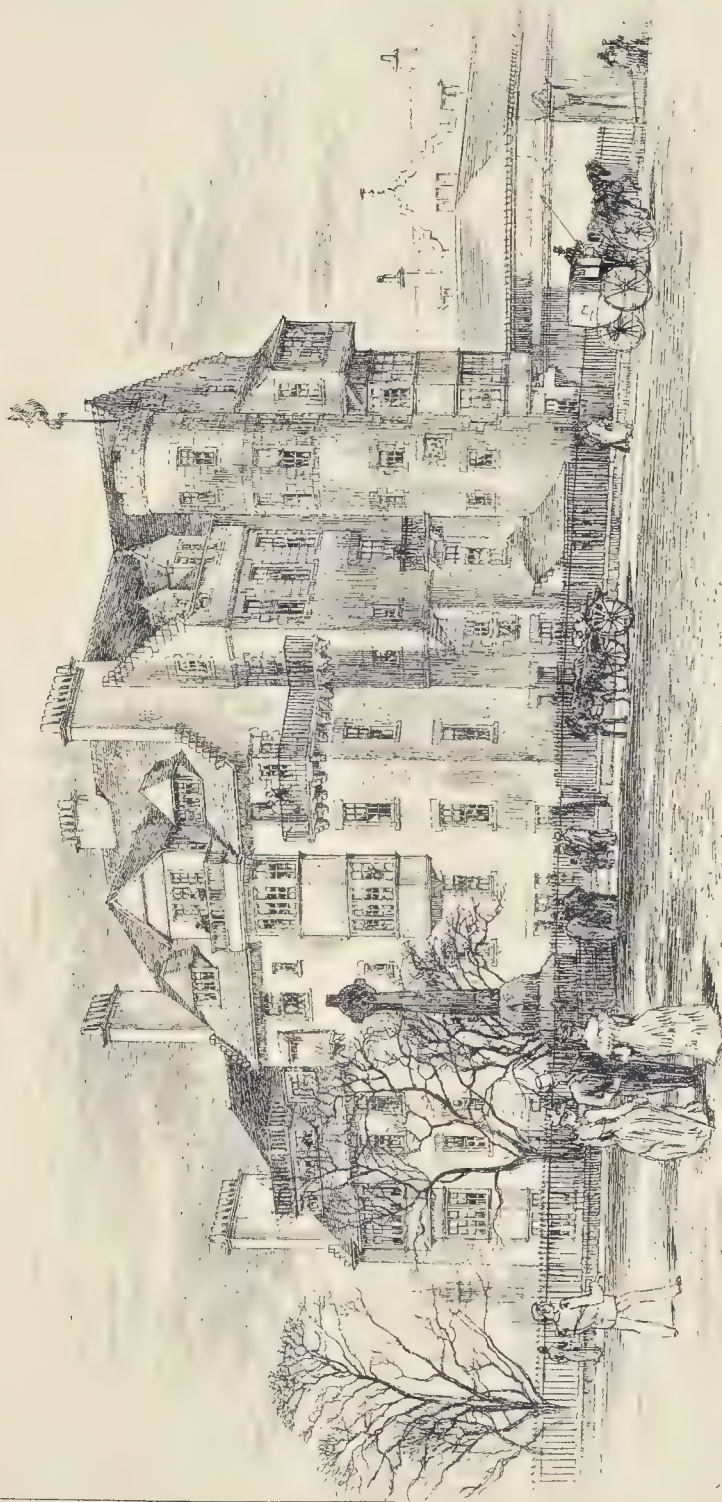




ARCHITECTURAL ASSOCIATION EXCURSION SKETCHES ON THE LINE OF ROUTE



NO. 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100



University Hall Extension
Castle Hill for Rev. Patrick Geddes
S. Henbest (Oppen M.A.) Architect





THE NEW CITY BUILDINGS, OX

Royal Academy Exhibition 1893



HENRY T. HARE, A.R.B.A., ARCHITECT

beginning of seven students) until it now comprises two separate halls with between thirty and forty students in residence. The second of the two halls already established (in Riddle's-court, Lawnmarket) has gained the further object of rescuing from squalor and preserving to the city old Bailie Macmorran's house, one of the most interesting and historical of the old Edinburgh dwellings, where royalty has been more than once entertained by the civic authorities in bygone days.

The success of the scheme has induced Professor Geddes to undertake a wider development, in which not only accommodation in separate "halls" will be provided for students, but also dwelling-houses for some of those interested in, or connected with, the scheme. In this way it is intended that the students in residence shall be brought into social contact, not only with each other in all the Faculties, but also with their seniors in University life, and, more intimately than at present, with outside social influences. When completed, the scheme will form an important architectural contribution to the "old town" of Edinburgh, occupying a very prominent site on the steep, irregular slope of the Castle Hill. The buildings form two sides of a quadrangle, west and north, the former fronting the Castle esplanade on its southern side, and extending down the rapid slope of the hill in a series of descending buildings, the latter facing Princes'-street in a single terrace, with the valley of the old "Nor' Loch" intervening. The western portion has been first proceeded with, from the designs of Mr. S. Henbest Capper, M.A., A.R.I.B.A.; the northern portion being designed by Messrs. Sydney Mitchell, & Wilson. The view given is from the Castle esplanade, looking north-east; the block comprises seven different houses, varying in size from six to twenty rooms. The extreme irregularity of the site, both in area and level (there being a drop of 40 ft. from south to north on the western front), has necessitated a corresponding irregularity of plan; two blocks (out of three forming the western portion) are completed and shown in the illustration; plans of two floors are also given, forming the ground and third floors above the Castle esplanade (the latter being Professor Geddes's own house). The houses are all entered from the circular stair, beside which is a luggage lift; on the ground floor is a separate entrance to the largest house, which extends to the floor above, and also to a basement. The building, occupying the highest site in the city outside the castle, and overlooking both the Esplanade and the beautiful Princes'-street Gardens (a public park), commands very notable views all round. In keeping with its site, as a fitting adjunct to the historical Lawnmarket and Castle-hill, it has been designed in revival of the old Scottish Domestic architecture so characteristic of Old Edinburgh, of which important specimens have come down to us in John Knox's house, the Marquis of Huntly's town mansion, and others. The buildings are of stone "harled" (*i.e.*, rough-cast) in cement, with red freestone dressings; projecting eaves and windows, balconies, &c., have been introduced as in character with the style and suitable for such a situation; the roofs are partly tiled, partly slated with Aberfoyle green slates. The contractor was Mr. James Slater. The perspective is a drawing by Mr. T. Raffles Davison.

NOTES ON HYDRAULIC FORMULÆ.*

THE object of the author in placing these notes before the members of the Association is, first, to show the unsatisfactory state of the present position as regards the formulæ in general use for determining the discharge over weirs, and of sewers; and second, to suggest, if not a remedy, at least a means by which the question may be placed on a more satisfactory footing.

With regard to weirs of small size, such, for instance, as are frequently employed in estimating the discharge of streams for purposes of water-supply and the discharge of sewers, the published tables are generally based upon the formulæ $Q = 2.14 \sqrt{H^3}$. The experiments of Castel, Smeaton, Blackwell, and other observers, however, show that the co-efficient varies with the width of the weir relatively to the channel in which it is placed, and with other conditions, so that if any approach to accuracy is desired, all the circumstances must be taken into account in determining the value of the co-efficient to be employed. As

an instance, the case of a weir 1 ft. in width, with a depth on the sill of 3 in., may be considered. Here, according to the formula quoted, the discharge would be 26.75 cubic ft. per minute. But, in gauging a small stream, Castel found that the accurate discharge would be given by the formula—

$$Q = 3.21 \times l \times H \times \sqrt{H}$$

where

Q = discharge in cubic feet per second,

l = length of weir,

H = head on sill of weir,

and the discharge, in the case under consideration, would be 24.00 cubic feet per minute, or about 10 per cent. less than that given by the formula first noted. It will be apparent to the members of the Association that this discrepancy might, in some cases, be productive of grave consequences to those relying upon the accuracy of the first formula given. We cannot follow the subject farther in a short paper, but the author hopes that members may be induced to investigate the subject, in cases where sewers under their care discharge into settling tanks, and where the actual facts can be ascertained by direct measurement.

With regard to the much larger subject of the formulæ applicable to sewers, the existing state of affairs is lamentable in the extreme, and it is somewhat remarkable that a country which boasts a foremost position as regards the construction of sewerage works, should have made no attempt to solve the difficulty. Millions sterling are spent every year on these works, and yet there are, so far as the author is aware, absolutely no reliable observations to be found which deal in anything like a proper and comprehensive way with the subject. We have an Ordnance Survey conducted at great cost, and productive of the best results; why not, therefore, a comprehensive series of experiments on the flow of liquids, such as sewage, in channels of stoneware and brickwork, such as local authorities are for ever spending large sums upon? The information would prove of very great value to the community at large, and it is not unreasonable to ask that the Local Government Board should ask Government for a grant of money in order to carry out so desirable an object.

The author is aware of the experiments by Darcy and Bazin, and other observers, and most valuable and instructive they are; but they were generally made with clean water, and curiously enough, although the experimenters named found that the condition of the surface of the channel, as regards roughness, exercised a very considerable amount of influence on the velocity of the liquid flowing along it, and although brickwork is very commonly used in sewer construction, in either the circular or egg-shaped form of section, yet the experiments to determine the co-efficient of roughness for that material were made upon a channel of rectangular cross section, and it by no means follows that the results are fairly applicable to channels of the sections referred to, as commonly constructed.

It may be convenient here to note the formulæ in general use, and it may be stated at the outset that the fundamental formula is that of Chezy, in which $v = C\sqrt{rs}$, where

v = velocity in feet per second,

r = hydraulic mean radius,

s = slope of the surface,

C = a co-efficient.

It will be noted at once that the values of r and s may be readily ascertained when the fall and dimensions of the channel are known, but to find a proper value for C has been the most difficult of problems, and indeed one that still remains unsolved. Consider, for instance, the case of the formula very commonly used, that of Eytelwein; in this case C has a constant value of about 93; but Darcy's experiments showed that C should vary from about 60 to 147, according to the size and condition of the channel! Another well-known formula is that of Weisbach, which, as usually written, is of a complex character; but it is capable of simplification, and may be written thus:—

$$v = \sqrt{\frac{257.6}{c} rs}$$

In this case c is a co-efficient varying with the velocity, its value for a velocity of 2 ft. per second being .0263, and for that of 6 ft. per second .0213, with, of course, intermediate values for velocities between those quoted. As written above, the formula agrees very closely indeed with that of Neville, which is as follows:—

$$v = 140 \sqrt{rs} - 11 \sqrt[3]{rs}$$

In both these formulæ, v = feet per second.

Having referred to the leading authorities, we

may next see how they agree with results obtained by the author, although these are, indeed, far too few to do more than prove the accuracy of the opening remarks by him.

It is well known that the main outfall sewers of the metropolis were designed in accordance with Eytelwein's formula, but it is only recently that means for accurately ascertaining their discharging capacity have been provided. It has always been assumed that the northern outfall would discharge 33,000 cubic ft. per minute, and as recently as 1891, when Sir Benjamin Baker and Mr. Binnie presented a joint report upon the drainage of the metropolis, there was nothing in the shape of reliable data obtained experimentally to show that the assumption was an incorrect one. But since means have been provided for ascertaining the discharge, within reasonable limits of accuracy, it has been demonstrated that the outfall will discharge at least 33 per cent. more than it was calculated to, and this is more or less true of the other main sewers, which will account for the former inadequacy of the main pumps to deal with the volumes brought down in times of heavy rainfall, and the consequent provision of auxiliary engines at Crossness, and at the Western pumping station. It is hardly necessary to remark that pumps do not discharge, as a rule, more than the calculated quantity. Another fact in support of the statement given above is, that soon after the works were inaugurated it was found necessary to lower the sills of the permanent storm-overflow weirs at Old Ford, because a much larger volume was brought to them than was anticipated, and indeed it will be apparent to the members that cases may arise in which serious results would ensue upon the discharge of volumes so much in excess of those calculated upon.

The author has also made some experiments upon much smaller sewers than the northern outfall, and in these cases also, all the authorities quoted were found to be incorrect to the extent of from about 10 to 70 per cent. The formula by Kutter, which has of late been much noticed, must be used with very great care, since the values given for n , the co-efficient of roughness, have much more importance than at first sight appears to be the case.

After carefully testing this formula, the author is of opinion that it is in no respect superior to that of Darcy, if, indeed, it is as good. Very great care must be exercised in selecting a proper value for n , and the one for brickwork, namely, .013, is not high enough for large sewers, and is far too large for small ones. Here is the formula for the information of those interested in the question:—

$$v = \sqrt{\frac{\frac{1.811}{n} + 41.6 + \frac{.00281}{s}}{1 + \left(41.6 + \frac{.00281}{s}\right) \frac{n}{r}}} \sqrt{rs}$$

It will be observed that the expression within the brackets contains n , the value of which varies from .009 to .035 according to the nature of the channel or river, and the utmost care and much experience are desirable in employing this formula, although, perhaps, this is equally true of others also.

Darcy's formulæ is as follows for brickwork:

$$v = \sqrt{\frac{2g}{m}} \sqrt{rs} = c \sqrt{rs}$$

$$\text{where } m = a \left(1 + \frac{B}{r}\right),$$

a being = .0037285, and B = .229663.

The author is of opinion that the results obtained by the use of this formula are, for sewers, superior to those obtained by any other at present employed, although further experiments are very much wanted in order to determine the proper values of a and B . With the figures given, c ranges in value from 78 for 6-in. pipes to 126 for sewers 10 ft. in diameter.

In conclusion, the author feels that it rests with the municipal engineers of to-day to solve the problem. Many of them have charge of sewage works with open channels, and with tanks, in which the discharge can be accurately measured. If they will take the trouble to make the observations, the author will be happy to tabulate the results and send them to this Association. It is hardly necessary to say that extreme accuracy is desirable. The water should be "in train," *i.e.*, it should have the same sectional area throughout the length of channel experimented upon; the invert slope, which, if the water is in train will be the same as the surface slope, should be accurately taken; the channel should be free from

* Being a paper read by Mr. W. Santo Crump, M.Inst.C.E., at the recent meeting of the Association of Municipal and County Engineers, West Bromwich.

deposit, and its nature should be carefully noted, together with its shape. These details, in say a hundred cases, would prove of the very highest value to the municipal engineer, and to the community at large.

In some cases, a very close approximation to the mean velocity may be obtained by the use of a coloured liquid of about the same specific gravity as the sewage, introduced into the channel just above the higher of the points of observation. A small cloud is at once formed, and as it flows past the point referred to, the time should be noted when its centre is opposite the mark. As it flows down the channel it becomes elongated by reason of the different velocities of the liquid at varying depths, and some little difficulty will be experienced in noting the centre of the cloud as it passes the lower point of observation, but if the points are not too far apart, a very fair result may be obtained, and the author hopes members may be induced to try experiments wherever practicable in the direction indicated, noting at the same time the surface velocity, as found by means of floats. The author is satisfied that if this is done much of the confusion now prevailing will be remedied, and the whole question, as regards sewers at any rate, will be placed on a satisfactory basis.

Books.

Molesworth's Pocket Book of Engineering Formulae. (Twenty-third Edition.) London: E. & F. N. Spon.

THE preface to the first edition of this well-known pocket book is dated November, 1862, and to prove its popularity among engineers it is only necessary to refer to the fact that in thirty years its sale should have run through twenty-two editions. Our readers must not imagine that the new edition just issued is a mere reprint of former editions with additions. On the contrary, the whole matter appears to have been carefully revised, the sequence of data thoroughly studied, and the formulae relating thereto systematically arranged. The index also has been considerably enlarged and improved. In the place of an index consisting of thirty double-column pages, including the index to the supplement contained in the previous edition, we have now forty-six and a half double-column pages, so well compiled that reference involves no undue labour.

The twenty-second edition contains 732 pages of subject-matter, including a supplement of 17 pages upon electric lighting. The information contained in this supplement was useful, but we always regret additional matter being printed as a supplement in a handy-book for rapid inspection, as its independent existence at the end of a volume is almost sure to be forgotten when searching for information in the hurry of business. The present volume contains 735 consecutive pages without a supplement. Additional matter is presented upon the following, among other subjects:—Oil and gas engines, submarine mining, moorings and buoys, methods of sounding, tests of steel, proportion of crane-hooks, railways and cable tramways, strength of riveted joints, table of the bearing and shearing areas of rivets, modern sections for pillars and their strength, corrugated flooring for bridges, and terms used in carpentry.

General de Lisle's earthwork tables are omitted, and other earthwork tables substituted. A useful comparison of formulae for the flow of water in channels is given, also the focal length of lenses and the areas, together with the circumference of wire to the new legal standard wire gauge, which, by order of Council, came into operation March 1, 1884, while upon another page is given the diameter of the gauge in inches, and its comparison with other recognised gauges is clearly indicated.

Another good feature of the book is, that it is not overburdened with advertisements; and its compact size (outside dimensions 5 in. by 3½ in. by 1 in.), renders it convenient for the pocket. To the twenty-second edition, the name of Sir Guilford L. Molesworth alone was attached; but in the twenty-third edition we find his name coupled with that of Mr. Robert Bridges Molesworth, M.A., Cantab. The latter name bears also the designation of Assoc. Mem. Inst. C.E., and considering that Sir Guilford Molesworth is a member of the Council of the Institution of Civil Engineers, we are somewhat surprised to observe that the description of his rank in scientific societies is limited upon the title-page to Member of the Institute of Mechanical Engi-

neers, it being well known in the profession that while all auxiliary engineering associations have their special importance, the title of full membership in the Institution of Civil Engineers is deemed of greater value, in the same way as Fellowship in the Royal Institute of British Architects is recognised as a higher qualification than membership in junior architectural societies.

Practical Surveying (Third Edition). By G. W. USILL, Assoc. Mem. Inst. C.E. London: Crosby Lockwood & Son.

IN perusing the new edition of this compact and well illustrated text-book, we are inclined to ask the question, do fresh editions of text-books always include every alteration and improvement desired by an author; or do publishers assert that such alterations will render the reproduction too costly by upsetting the arrangement of pages. Additional pages are often permitted in a new edition, but a work is not always so thoroughly revised as might be wished.

In our issue, dated February 12, 1887 (page 268), we reviewed the fourth edition of *Merrett's Surveying*, to which Mr. Usill had added a useful appendix. The plans for teaching survey work in Merrett's book are excellent, but Mr. Usill probably finding it difficult to include all he desired to add, especially upon the subject of taking levels, brought out a book of his own, which has now deservedly reached a third edition. We regret, however, that some of the points noted in the review of his work, which we gave in our issue of June 8, 1889, have been passed over in his third edition, perhaps for the reasons above-stated. Respecting the level book, we are glad to read the footnote upon page 202, although we maintain the views given therein in our previous criticism. Designed, however, as a text-book for students, the work contains so many practical remarks, that we can confidently recommend its study by young beginners, but we advise them to leave their minds open for adapting the suggestions contained in our previous notice, to the system they may adopt as practitioners.

A Collection of the Statutes regulating Building within the Administrative County of London, with Concise Notes and Cross References. By W. R. GRIFFITH, Barrister. London: W. Clowes & Sons. (1893.)

THE most striking point about this book is that it shows the need for a consolidation of the Metropolitan Building Acts. The work begins with the Metropolitan Building Act, 1774, and contains no less than eighteen Acts or parts of Acts within its pages. It is, in the chaotic state of this branch of the law, a fairly useful book, because within a small compass the several enactments relating to building in London can be found with business-like and short notes. There is really no more to be said about a book which has no ambitious aims, and which does not profess to be more than a collection of statutes, by-laws, and forms.

GLASGOW ARCHITECTURAL ASSOCIATION.—The usual monthly meeting of this Association was held in the rooms, 174, West Campbell-street, on the 1st inst.—Mr. Wm. Conner, A.R.I.B.A., in the chair when a paper was read by Mr. Wm. Cowie, A.R.I.B.A., on "Church Planning." Treating the subject at first in a historical manner, the lecturer traversed the various developments of plan arising from precedent and necessity. He then proceeded to deal at length with various points in the planning of modern churches, special reference being made to the acoustics. Mr. Andrew Robertson, A.R.I.B.A., opened the discussion, and at the close a hearty vote of thanks was awarded the essayist.

THE SANITARY INSPECTOR EXAMINATIONS.—At an examination for inspectors of nuisances, held at Cardiff on July 28 and 29, 1893, thirty candidates presented themselves. In the case of one candidate the examiners have not yet come to a decision, but the following sixteen candidates were certified, as regards their sanitary knowledge, competent to discharge the duties of inspectors of nuisances:—James Bullock, Brockley, S.E.; Thomas Cawsey, Pontypridd; R. B. Choulter, Port Talbot; John Coombe Cowling, Launceston; Samuel Evans, Canton, Cardiff; Frank Glover, Roath, Cardiff; Stephen J. Holbourn, Cardiff; John White Holden, Roath, Cardiff; David Jenkins, Cardiff; Thomas Jones, Neath; Arthur Edward Mills, Wells; Somerset; Evan Thomas Morgan, Pontypridd; Charles Moore, Wrexham; Alfred Pearce Preston, Cardiff; John William Riggs, Torquay; Frank Robert Slade, Bristol.

Correspondence.

To the Editor of THE BUILDER.

GLASGOW MUNICIPAL BUILDINGS.

SIR,—In his letter on page 125 Mr. W. Young says that the waste-pipes are trapped off at the bottom and ventilated to above the roof, and being so it is absurd to suppose that drain-air from them could get out anywhere. It is not so absurd, however, if it be the case, as Mr. Fyfe's report seems to assert—viz., that air-pipes from off the soil-pipes have been led back into rain-pipes or waste-pipes.

If it be true that air-pipes from off the soil-pipes are joined into either the waste-pipes or rain-pipes, or into both, then no "very big if" is needed to tell us that smoke put into the soil-pipes, or into the drains in free communication with them, could easily pass into either or both the waste-pipes and rain-pipes. Or, if the smoke were put into the rain-pipes or waste-pipes, which have air-pipes from the soil-pipes connected into them, then said smoke could easily pass through these air-pipes into the soil-pipes. Then as to ventilating the soil-pipes by means of a drain-pipe connected "to the back of the boilers," may we ask what guarantee existed that bad smells from the drain ventilating-pipe so connected would not come into the building should the fires be off for some time?

Mr. Young says on page 125 that the anemometer showed a down-draught in all the soil-pipes. Mr. Fyfe, however, asserts that his anemometer showed a down current in very few of them—which is right?

Further, is the plan good or bad? I think it bad. In Mr. Fyfe's report it is stated that the disconnecting traps used on the drains are the old-fashioned, inaccessible, and non-ventilating "sow-back" ones. We are entitled to ask why this is so when for a number of years back hundreds of landlords in Glasgow have been forced by the action of the sanitary authorities to take out these "sow-back" traps from their properties and put in others of newer design? SANTARIAN.

P.S.—In his letter, Mr. Young also states:—"There had been the best official advice in the pipe experience of the late City Architect, who took a special interest in all the sanitary work." Now as this seems to imply that the late Mr. Carrick was consulted in the matter and looked after the work so far while it was going on, and if so he would be to blame partly if anything was badly planned or wrongly done, I beg to challenge the statement to understand that Mr. Young insisted on the work being done as he (Mr. Young) wished. S.

The Student's Column.

GEOLOGY.—VIII.

THE MINERAL CONSTITUTION OF ROCKS.

HAVING described the more salient of the rock-forming minerals, we are now in a position to refer to the various kinds of stone made up of them. Before commencing, it will be well to mention a few physical features connected with the subject.

As we have previously remarked, a "rock" may be constituted of one mineral only, or of a number of minerals. Some of these were formed when the rock was first made, and have undergone but little change; these are called *original* minerals. Others—a numerous class—did not make their appearance until a subsequent period, filling up the cavities left by original minerals, or molecularly replacing or occupying spaces between them; these are termed *secondary* minerals.

In a rock containing several minerals some will be sure to predominate; these are termed *essential*; whilst the less abundant, or rarely occurring, are known as *accessory*. Rocks may be *crystalline*, composed of crystals; *semi-crystalline*, in which the minerals are only incipiently, or, in part, imperfectly crystallised; *earthy*, not containing crystalline minerals; *vitreous*, like bottle glass; *flinty*, having a dull texture; *clastic*, composed of fragments, or detritus; *granular*, made of irregular little grains of mineral matter; *stratified*, exhibiting layers or beds running more or less parallel to each other; *laminated*, occurring in leaf-like layers; *massive*, non-stratified, having no definite arrangement; *foliated*, composed of minerals in wavy layers, each essential mineral constituting a distinct layer; *schistose*, similar to foliated, except that, as a rule, the layers are much thinner and occur in sinuous or tortuous lines; *vesicular*, as applied to lavas, full of little holes; or, *amygdaloidal*, where the vesicles or cavities alluded to have been entirely, or partially, filled up by mineral matter. The foregoing comprise some of the terms most commonly applied to rock structure on a large scale, and the student should commit them to memory.

In regard to their composition, rocks are said to be *silicious* when they contain large proportions of free silica; *felspathic*, when felspars are principally in evidence; *quartzose*, when composed of quartz; *argillaceous*, of clay; *calcareous*, of lime; *arenaceous*, of sand; and so on.

Igneous.—The mineral constitution of igneous rocks is extremely variable. The student will have noticed that the majority of the common minerals are associated with this section of the great rock-classes. The following table shows at a glance some of the primary features connected with the divers kinds of igneous rocks used by the architect and engineer:—

Mineral Composition, &c., of Igneous Rocks.

I.	II.	III.	IV.	V.	VI.
Plutonic.	Granite.	Quartz, felspar, biotite, muscovite.	Schorl, hornblende, apatite, magnetite, pyrites, kaolin.	2'66	Schorlaceous granite, Hornblende "
	Syenite.	Orthoclase, hornblende.	Plagioclase, quartz, mica, augite.	2'75 2'90	Augite-syenite, Mica "
	Gabbro.	Plagioclase, diallage.*	Olivine, augite, hornblende.	2'85 3'10	Olivine gabbro.
	Diabase.	Plagioclase, augite.	Magnetite, titaniferous iron, quartz.	2'80	Olivine diabase.
Volcanic.	Trachyte.	Sanidine felspar, oligoclase, hornblende.	Biotite, magnetite.	2'65	Quartz "
	Basalt.	Augite, magnetite, titaniferous iron.	Plagioclase, olivine, nepheline, leucite, mica.	2'85 3'10	Plagioclase basalt. Mica "

* We have not previously alluded to this mineral, as it is not a very common rock-former. It is essentially monoclinic, with a chemical composition similar to that of augite.

I. Classification by origin or position.

II. Name of rock.

III. Essential minerals.

IV. Common accessory minerals; it is very difficult to draw the line between an essential and an accessory mineral where the former is not so abundant as might be for the class of rock in which it is contained, and where the latter is more plentiful than usual. The determination of such points as these is largely a matter of individual opinion.

V. Specific gravity.

VI. Varieties of each rock, according to the predominance of the minerals named in column IV. In such varieties the mineral imparting a distinctive character to the rock must be regarded as an essential constituent. The elevation of an accessory to the rank of an essential mineral is frequently accomplished at the expense of one or more of the latter.

The following is the chemical composition of a typical variety of each of the rocks mentioned in the above table:—

Excellent 'gabbros' are found in the United States.

Diabase is common in certain parts of Scotland, both in contemporaneous beds and in intrusive sheets and dykes. There are many varieties of the rock, founded both on mineral constitution and on structure. It is occasionally porphyritic or concretionary; and when it contains much free silica, which is rarely the case, is known as quartz diabase. Calcite frequently occurs as a secondary product in these rocks. The green antique porphyry, or *Marmor Lacedaemonium viride*, much used for pavements and general inlaid decorative work in ancient Greece and Rome, is a diabase. A similar stone is employed in Scotland as a road-metal, but the extensive outcrops of the material in Maine and New Jersey produce good stone, which is polished, or used for paving, on a large scale.

All the above-mentioned rocks, being plutonic in origin, are thoroughly crystalline in texture and very hard. They are amongst the most durable stones known, but have, nevertheless, to be

Chemical Composition of Igneous Rocks.

Name of Rock.	Silica.	Alumina.	Oxide of Iron.	Potash.	Soda.	Lime.	Magnesia.	Titanic Acid.	Oxides of Iron and manganese.	Loss, Water, &c.
Granite	72'07	14'81	2'22	5'11	2'79	1'63	0'33	—	—	1'09
Syenite	59'83	16'85	7'01	6'57	2'44	4'43	2'61	—	—	1'29
Gabbro	49'00	15'00	—	0'30	2'50	9'50	9'70	—	11'50	2'50
Diabase	49'54	14'05	14'27	1'16	3'88	8'20	5'28	—	—	2'29
Trachyte	67'00	15'64	—	3'47	5'08	2'25	0'98	0'38	4'74	0'45
Basalt	44'50	16'75	—	—	2'60	9'50	2'25	—	20'12	2'00

Granite.—Many types of this rock exist in nature. They may be fine, medium, or coarse-grained; as a matter of experience it is found that the largest blocks are obtainable from the quarries yielding coarse-grained stone, though this is not universally the case. *Porphyritic granite* is a term applied to those which possess a fine or medium-grained base, and have large crystals of orthoclase felspar, sometimes as much as four inches in length, displayed in a prominent manner here and there. *Graphic granite* is distinguished by the manner in which the quartz has assumed the shape of long, imperfect columnar hollows placed parallel to each other, and enclosed within orthoclase in such a way that the markings on a transverse section of the stone look somewhat like Hebrew writing. *Schorlaceous granite* is largely found in Cornwall; the crystals of schors are usually larger and more abundant nearer the "killas," or clay slate by which the granite is surrounded or partially overlain, than in the centre of the granitic masses. *Hornblende granite* is commonly called syenite in some parts of the country, but as will be found on reference to the first of the above tables, the mineral composition of the rock differs from that now under

carefully selected, some kinds being so much better than others.

Trachyte and *Basalt* are volcanic rocks, and though not so crystalline as the plutonic, they usually form a superior class of road-stones. As they do not often occur in large blocks, and will not take a good polish by reason of their roughness and texture, they are not used for ornamental purposes in England.

Pumice is well-known to the builder, and should here be described. It is a general term used for the solidified froth-like parts of lava, and owes its peculiar vesicular structure to the escape of steam or gases through its mass when in a molten condition. From its origin, it will be perceived that it is a product of several kinds of volcanic rocks, and its chemical composition is, therefore, extremely variable, which accounts for our not having included it in the above tables. Its percentage of silica ranges from 57 to 73; alumina, 9 to 20; and the remainder consists of lime, magnesia, potash, soda, and peroxide of iron; water is present; specific gravity 1'9 to 2'5, floats on the surface of water. *Pumice-stone* is largely used for cleaning down paint, &c. It is met with in all volcanic centres, and has been largely quarried

at the foot of Cotopaxi, one of the volcanoes of the Andes; it there occurs in beds alternating with obsidian. The principal localities in Europe where it abounds are the Lipari Islands, and some of the islands of the Grecian Archipelago, in Iceland, and in the extinct volcanic region of the Rhine.

GENERAL BUILDING NEWS.

CATHOLIC CHURCH AT MERTHYR, GLAMORGAN.

On the 3rd inst. the Bishop of Newport and Menevia laid the primary stone of a new Catholic Church, which is now in course of erection adjacent to the Priory in Pendarren Park, Merthyr. The church, says the *Western Mail*, consists of a nave, north and south aisles, and transepts. The greater part of the crossing of the nave and the transepts will be temporary used for the chancel, whilst the north transept will be filled up for the sacristy. The style is generally of a severe Early English type, a little freer play of design being given to the west end, where the trefoil-headed doorway is already erected, with clustered columns to the jambs and moulded headway. It is flanked by lancet windows, and is to be surmounted by five lancet lights of various sizes, the wider and loftier one being in the centre. The front of the nave will be finished on each side with buttresses rising above the roof eaves, and finished by weathered gables. The aisle roofs are lean-to. Additional entries are to lead into each transept. The roof is to be slated. Internally, there is a nave of four bays, separated from the aisles on either side by piers, alternately circular and octagonal and pointed double chamfered arches. The fifth and larger archway opens into the transepts on either hand, whilst a still larger and loftier archway is prepared for the future chancel. Lower archways are to form the connexions from each transept to the side chapels. The walls are built of local stone, the windows, piers, arches, and other dressings are of box ground Bath stone from the quarries of the Northey Stone Company. The windows are to be glazed with tinted cathedral glass. The architect is Mr. Joseph S. Harrison, of London, and the contractor Mr. T. Rees, of Merthyr Vale. The cost of the building will be about 5,000l.

INTERMEDIATE SCHOOL, ABERDARE.—On the 10th inst., Lord Aberdare laid the foundation-stone of a new intermediate school at Aberdare. The building is being constructed of stone, with Forest of Dean stone dressings. Accommodation is to be provided for 180 children—100 boys and 80 girls. The boys have four class-rooms, and the girls three, with a room to be devoted to instruction in practical cookery. In the centre of the building there will be an assembly-room to accommodate all the pupils of the two departments, and it will be provided with a movable screen. There are rooms for the teaching staff, and detached from the main structure there is to be a laboratory and workshop, space being retained for a gymnasium. The architect is Mr. J. H. Phillips, of Cardiff, and Mr. David Jenkins, Swansea, is the contractor.

BANK BUILDINGS, ASHBURTON.—New premises have been erected by the Capital and Counties' Bank Company, Limited, on the site of the old "Duke's Head" Inn, Ashburton. The external walls are faced with stone obtained from Bishopscote, with gable copings. Dressings of doors and windows and other ornamental features are of Monk's park-stone, supplied by the Bath Stone Firms, Limited, the roofs being covered with tiles from the works of Woolliscroft & Sons, Hanley. The building contains on the ground floor bank office, occupying the entire frontage to the street, manager's room, strong room, lavatories, &c., with private entrance, hall, breakfast-room, kitchen, and other domestic offices in the rear; and on the chamber floor dining and drawing-rooms, five bedrooms, bathroom, housemaid's pantry, &c. The works have been carried out by Mr. Henry Stevens, builder, Ashburton, from the designs and under the superintendence of Messrs. J. W. Rowell & Son, of Newton Abbot.

HOME FOR INCURABLES, NEWCASTLE.—The new Home for Incurables, Moor Lodge, Newcastle, was opened a short time since. The plan of the main building is E-shaped, the vertical leg forming the main building, the middle section the dining-hall and kitchen block, and the top and bottom sections the men's and women's pavilions, the cancer pavilion being parallel to and placed at a distance of 67 ft. from the men's pavilion, but connected by a corridor, which is an extension of the corridor running through the main block. The new buildings will afford accommodation for sixty-eight inmates and the necessary staff of nurses, officials, and servants. Entrance is obtained under a moulded stone archway, surmounted by the City Arms, forming an open arch porch which admits to an entrance hall paved with Minton's tiles. There is a steam radiator in the hall to warm the air and prevent a cold draught into the main corridor, which is approached through a screen, the sashes of which are filled in with ornamental lead fret glazing by Messrs. Atkinson Brothers, of Newcastle. On the right is the matron's sitting-room, with linen store and officers' dining-room adjoining, and beyond, the women's workroom and dayroom, with the entrance for women at the east end of the main corridor. On the left of entrance hall is the committee-room

and library; the doctor's room, with dispensary and lavatory adjoining; and beyond, the men's workroom and dayroom, their entrance being on the south front, and the smoke-room. These rooms all face the south, and are connected together by the main corridor, which is 9 ft. wide and 195 ft. long. There is a similar corridor on the first floor, and both are fireproof, the floors being formed with cement concrete filled in between light steel joists and paved with diagonal pattern tiles and cement. The first floor of the main building over the rooms before enumerated contains bedrooms for nurses, sitting-room, matron's bedroom, bathroom and lavatory, and two dormitories or wards, and in the rear the officers' staircase, nurses' bathroom, slop shoot, and other offices. The centre block of main building is raised to form attics for servants. There is a hospital lift for the use of infirm patients connecting the different floors. In the centre and behind the main building is the dining-hall and kitchen block; the dining-hall opens out of the main corridor near the front entrance, and is 36 ft. long, 24 ft. wide, and 12 ft. high. It is intended to use this room for concerts and amusements for the inmates, and a portable stage will be placed at one end. Adjoining the dining-hall is a serving-room, which communicates with the kitchen. The pantry, larder, and scullery have their walls finished with white glazed bricks. There is also in this block accommodation for stores. There is a mortuary at the end of the central block, the walls of which are lined with white glazed bricks and open to the roof. The laundry and boiler-house are placed in a half basement under part of the kitchen block. There is also a wash-house lined with white glazed bricks, ironing-room and drying-stove, fitted by Messrs. T. Bradford & Co. The pavilions adjoining the sections of the letter E on the east for women and on the west for men contain in each two wards for ten beds, 38 ft. long and 24 ft. wide. There is a nurse's duty-room attached to each ward, a dressing-room heated by a steam radiator, and a bathroom. The ward offices are in an annex cut off from the wards by cross ventilated lobbies. All the staircases throughout have York stone steps and landings. The pavilion for the care of twenty cancer cases is a separate block two stories high, 52 ft. in length, and contains on each floor a day room, a separation ward for one bed, nurse's duty-room, dressing-room, and a ward for nine beds, 47 ft. long and 24 ft. wide. The ward offices are in an annex at the end of the pavilion. The contract for the erection of the new buildings was entrusted to Messrs. Middlemiss Brothers. Mr. Robert Herron has executed the plumbers and gas-fitters' works, and the painting and glazing have been done by Messrs. Adam Robertson & Son. The ventilating arrangements have been carried out by Messrs. C. Kite & Co., of London, the steam heating and hot-water supply by Messrs. Ashwell & Nesbit, of Leicester and London, the cooking and laundry work by Messrs. Bradford & Co., of Salford, and the electric bells and lightning conductors by Mr. F. Reid, of Newcastle. The whole has been designed and executed from the plans prepared by Mr. Edward Shewbrooks, the architect to the Schools and Charities Committee, and under his personal supervision, assisted by Mr. David Reid as clerk of works.

PROPOSED RESTORATION OF MORRERLEY CHURCH, CHESHIRE.—St. Wilfred's Church, Moberley, Knutsford, is to be restored from plans prepared by the late Mr. J. S. Crowther, the Manchester Cathedral architect. The church has already been enlarged by the erection of a chancel, and new bells have been added, and the work now to be done will embrace re-roofing and re-seating.

EXTENSION OF ABERDEEN EPIDEMIC HOSPITAL. The accommodation at this hospital having become inadequate for the number of patients received into the institution, an addition to the buildings was regarded some time ago by the public health authorities as absolutely necessary, and tenders are now being taken in for the proposed extensions from plans by Mr. Rust, the City Architect. Some three or four acres of ground are at disposal for the additions, which are estimated to cost £2,750. At present there is accommodation for ninety-six patients, and room will now be made for 130. The main features of the extension will consist of the enlargement of the two centre pavilions towards Urquhart-road (adding about a dozen nurses' bedrooms); the re-arrangement of the administration block; making a new entrance gateway and façade, and the erection of a waiting-room beside the mortuary for use at funerals, and new offices at the east side. The plans show the extension of the two centre pavilions—there are four—by building an additional wing 80 ft. by 25 ft. to the north of each, capable of containing fourteen beds, and allowing 2,000 cubic ft. of space to each bed, with bathroom and water closet accommodation at the north end. A small private room for one bed is provided at the end of each ward, next to the entrance, the nurses' accommodation being provided in the centre between the old and the new wings. The architect has kept in view the probability, at some future time, of the present concrete pavilions being rebuilt in granite, and the plans show that this can be done without interfering with the new wings. The proposed additions will be built of granite, with

ashlar masonry, and finished on the inside with hardwood flooring. In the rearrangement and enlargement of the administration block, the new accommodation consists of a room and bedroom for a resident medical officer, and a laboratory and bathroom at the back, and a large store-room beside the side entrance door, with waiting-room on the east side, and dining-room on the west side of the central entrance. The back wing of the present building is only one flat high, and it is proposed to add another floor. The main entrance from Urquhart-road will have an iron gate and granite pillars, and a lodge is also to be built.—*Scotsman.*

WESLEYAN CHAPEL, KIVETON PARK, YORKSHIRE.—A Wesleyan Methodist Chapel has just been built at Kiveton Park, near Sheffield. The building is in the Gothic style. The architect was Mr. J. Allsopp, Worksop. Seating accommodation is provided for 150 persons. The contractors were Messrs. G. Middleton and G. Gregg, Worksop, woodwork and joinery; and Messrs. Baines Bros., South Anston, stone and brick work.

BAPTIST CHAPEL, BELPER.—On the 7th inst. the memorial stones of a new Baptist Chapel were laid at Belper. The edifice is in a central position in the town, and adjoins one of the main streets. It is designed to accommodate 500 people on the ground floor, and a gallery is to occupy three sides. The total cost, with the ground, is about 2,500. Mr. A. Hingley, of Duffield, is the contractor, and the architect is Mr. S. R. Bakewell, C.E., of Belper.

NEW DISTRICT POLICE OFFICE, GLASGOW.—The foundation-stone of the new Police Office, for the southern district of Glasgow, was laid on the 1st inst. by Councillor Gray. The building will occupy an area of ground extending to 2,390 square yards; the site has cost £2,000; and the contracts for the erection of the building amount to £6,000. There will be provided for the use of the Police Department a Court of Sessions, a Court of Magistrates, hall, witnesses' room, and fifty-five cells to accommodate 150 prisoners. Within the new buildings there will be barrack accommodation for fifty unmarried constables. The Lighting Department has also been provided for, and there will be offices in the building for the collector of assessments and registrar for the district. The architect of the building is Mr. A. B. McDonald, the City Engineer. Messrs. Rennie & Duncan are the contractors.

NEW CHURCH, MONTPELLIER, BRISTOL.—The foundation stone of the Church of St. Bartholomew, Montpellier, Bristol, was laid recently by the Mayor of Bristol. The new edifice will be a Gothic structure of local stone, with a nave, with tracery arches, and tracery windows of Box ground stone. The arcade arches on the north and south sides of the nave are to be of Box ground stone, supported by Forest of Dean stone-moulded columns, with moulded caps and bosses. The nave and aisle roofs will be framed together with moulded pitch-pine ribs springing from Decorated stone corbels, while the chancel roof is to be framed with moulded pitch-pine ribs and moulded in panels between the principals. The seats, to accommodate 750 persons, will be of pitch-pine, and set on a raised wood floor. The aisles and chancel are to be laid with tiles. Clergy and choir vestries and organ chamber are to be placed on the south side of the chancel. The building is to be warmed by hot water. It has not yet been decided to erect the tower; the lower portion only is to be at present built to form an entrance lobby. Mr. W. Bassett-Smith, of London, is the architect, Mr. George Henry Wilkins is the contractor, and the building is being constructed under the superintendence of Mr. G. Machin, clerk of the works.

WORKMEN'S INSTITUTE, &c., BLAENAVON, MONMOUTHSHIRE.—On the 7th inst. the foundation stone of a new club, public hall, and other offices, Blaenavon, to be used as a workman's institute, was laid by Mr. R. W. Kennard, J.P. The premises will comprise:—on ground floor, main hall and double grand stairways, ticket office, newspaper-room (40 ft. by 20 ft.), magazine-room, recreation room (20 ft. by 16 ft.), committee-room, billiard room, public lavatories, entrance to reserved seats, ladies' and gentlemen's cloak-rooms, caretaker's kitchen and living rooms, and heating apparatus. The first floor consists of a large hall capable of seating 1,100 on the hall floor and 430 on the raised gallery over the main stair and hall. On the north side of the large hall will be a raised platform with private stairs, lady and gentleman artists' rooms and lavatories, with approach from main-road to the platform. The whole of the external walls will be built of Newbridge (Mon.) Pennant stone, with Forest of Dean stone dressing. The architect is Mr. E. A. Lansdowne, Newport, and the contractor Mr. John Morgan, builder, Blaenavon. The estimated cost is 7,000.

WESLEYAN CHAPEL, BAGBY, YORKSHIRE.—The foundation stones of a new Wesleyan Chapel were laid at the village of Bagby, near Thirsk, on the 6th inst. The plans, prepared by Mr. Thomas Stokes, of Thirsk, show a building in the Gothic style.

CHURCH OF ST. HUBERT, NORTH WICK, LINCOLN.—The foundation stone of a new church at Happle was laid recently by Lady Riddell. The church is a small one, to seat about 100 people, and is to be built of local stone, from designs by Mr. C. Hodgson Fowler, of Durham.

CHURCH, NEAR NEWENT, GLOUCESTERSHIRE.—The Bishop of Gloucester and Bristol consecrated on the 28th ult. a new church which has been built in the parish of Gortley-cum-Clifford's Mesne, near Newent. The church is in the Early English style, and was designed by Messrs. Rollinson, of Chesterfield. It is cruciform in plan, and the east end is apsidal, the centre window being filled in with a stained-glass representation of Christ as the Good Shepherd. The other windows are filled in with tinted cathedral glass. The pulpit is of carved oak (five panels), on a Bath stone base, the work and gift of Miss Emma Onslow, of Malvern. The church is floored with wood blocks, and seated with open pitch-pine benches.

PROPOSED CATHOLIC CHURCH FOR BRIDLINGTON, YORKSHIRE.—It is intended to erect a new Catholic Church at Bridlington. The building will consist of nave 54 ft. long by 17 ft. wide, with north and south aisles 8 ft. wide. At the end of each aisle will be a side chapel; one dedicated to the Blessed Virgin and the other to the Sacred Heart. Each chapel has at the end and side a small rose window, filled with tinted cathedral glass. The roofs will be groined with pitch-pine, moulded ribs, and the floors laid with encaustic tiling. The sanctuary will be 20 ft. in length and 17 ft. in width, and will have an octagonal apse with tracery stone window and a bay window on either side, with a lofty arch resting on clustered shafts of Hopton wood polished stone, and capitals, with carved Early English foliage, and moulded bands and bases. The arches separating the sanctuary from the side chapels are filled in with tracery oak screens. The nave will be divided on either side from the aisles by arcades of four bays, with moulded arches on octagonal shafts of Hopton wood polished stone, and moulded caps and bases. The choir gallery will be at the west end, above the main entrance, with an organ chamber at one side. The west front of the church will be built with thin red stock brick and stone dressings, the angle buttresses terminating in pinnacles of stone. A two-light tracery window in the west wall, with a bay window on either side, will fill the gable above the western entrance. The gable will be covered with moulded stone-coping, and a cross is to be fixed on the apex. There is to be a working and private sacristy and a confessional; below the sacristy a heating chamber will be formed. The accommodation provides for about 300 adults. The contract for the building is let to Mr. 1,870. The design has been prepared by Messrs. Smith & Brodbeck, and A. Lowther, of Hull, joint architects. Mr. John Rennard, of Bridlington Quay, is the contractor, and Mr. Fawcett, of that place, marble merchant, will supply the Hopton wood stone.

SANITARY AND ENGINEERING NEWS.

PROPOSED NEW BRIDGE, GLASGOW. At a meeting of the Glasgow Bridge Committee, held on the 17th inst., it was agreed to instruct the engineer, Mr. Blyth, to prepare new plans for a bridge 80 ft. wide, instead of 100 ft. as originally proposed. This course has been adopted owing to the cost—estimated at £42,000—of the wider structure.

SEWERAGE SCHEME, &c., BOLTON.—At Bolton, on the 3rd inst., Major-General Crozier, R.E., one of the first Messrs. Calbraith & Church, their local representative being Mr. Salter, and the contractors Messrs. Curry, Reeve, & Co., who have been represented by Mr. Barrons. The portion of the line now opened, from Tresmeer to Camelford, is nine miles and twenty-six chains long. The whole length from Launceston to Camelford, which was first Messrs. Calbraith & Church, their local representative being Mr. Salter, and the contractors Messrs. Curry, Reeve, & Co., who have been represented by Mr. Barrons. The portion of the line now opened, from Tresmeer to Camelford, is nine miles and twenty-six chains long. The whole length from Launceston to Camelford, which was first Messrs. Calbraith & Church, their local representative being Mr. Salter, and the contractors Messrs. Curry, Reeve, & Co., who have been represented by Mr. Barrons. 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new line—about 900 ft. above sea-level. Some two miles beyond Tresmeer the valley of the Camel is entered, and is followed with much divergence to a locality known as Melorn, where the Camelford station is situated.

FOREIGN AND COLONIAL.

FRANCE.—The railway company "de l'Ouest" has decided, it appears, to suppress entirely the long tunnel at Batignolles, an alteration which will permit of an increase in the number of lines of rail, but will also necessitate the enlargement of the bridge at Asnières. The cost of this important improvement, long demanded by the public, is estimated at from twelve to fourteen million francs.—The fine group by Girardon, "l'enlèvement de Proserpine," in the park at Versailles, is in such a state of decay that it can no longer be left in the open air. Accordingly the Department of Fine Arts has ordered that it should be transported to the Louvre, where an exact copy will be made for the park at Versailles. M. Suchet, the sculptor, who has already, under similar circumstances, made a reproduction of the "Nymphé à la Coquille" of Coysevox, is commissioned to carry out the work.—At Roubaix the reservoir for the water of the Lys, a masonry tower 12 metres high, surmounted by a reservoir 20 metres high, has given way, causing much damage and injuring a number of people.—M. Roger M. Suchet, the principal Inspector of Art Exhibitions, has officially inaugurated the Exhibition of Fine Art at Boulogne.—The death is announced of a well-known picture-dealer, M. Beugnot, who was the first, about fifty years ago, to create the picture-selling industry in the Rue Lafitte, which has since become a centre of this commerce. M. Beugnot has left to the Louvre a remarkable collection, which has been in process of formation for more than forty years, of the palettes used by the most eminent painters, and which, in the manner of disposing the colours upon them, are to a certain extent characteristic of the principle of colouring of each painter. They are all signed and accompanied by an original sketch.—M. Auguste Barthélemy Glaise, a painter whose reputation was once on the same level as that of Ingres, has died at Paris at the age of eighty-six. He was born at Montpeller, and had been a pupil of Achille and Eugène Deveria. He first exhibited at the Salon in 1835, and having first treated religious subjects, he subsequently went to literature and romance for subjects, which he often treated very happily. He also cultivated lithography and pastel with success. Among his principal works may be named "Faust et Marguerite," "Dante," "Le Poète," "Le Poète," "L'Aveugle et le Paralytique." Glaise received medals in 1842, 1844, 1848, and 1855. He leaves a son, M. Léon Glaise, who is also well known as a painter.—There has been discovered in the choir of the Cathedral at Albi, at the foot of the altar, a tomb containing bones and a pastoral staff, which latter is of the style of the thirteenth century.—M. Fagure has just finished a statue of Gambetta, intended for the statue des Pas Perdue at the Chamber of Deputies.—The town of Limoges is shortly to have a new monumental fountain.

SWEDEN AND NORWAY.—Arrangements are being made for the holding of a great Scandinavian Industrial Exhibition in Malmö in 1896. Efforts are being made to introduce the picturesque Swedish timber villas in the Riviera. It is considered that buildings in cases of earthquake. A company has been formed at Pegli, ten kilometres from Genoa, for the laying out of a villa town, and the company invites, through the Swedish-Norwegian Consul-general at Genoa, tenders for Swedish timber villas. Beams, flooring, and roofs are exempted from duty, but doors, window-frames, and carved woodwork pay a duty of 13 lire per rookilos. The carvings on the joints of the beams do not prevent duty-free import, but the duty-free materials must be imported separately, or otherwise they will be liable to duty. Further information may be obtained from the Swedish-Norwegian Consulate, Genoa, or the Director of the building company referred to, Signor Amadeo Bert, Salita dei Cappuccini 23, Genoa. The export of window-glass from Sweden to Great Britain is steadily increasing, reaching in 1892 2,536 cwts. valued at 7,125*l.*, as against 1,118 cwts., and 3,384*l.* in 1891. The export of other kinds of glass rose to 115,006 cwts. and 48,037*l.* in 1892, from 112,498 cwts. and 44,857*l.* in 1891.—The Christiania Municipality has approved the central electric works constructed by Messrs. Schuckert & Co., and the cost of the same, 749,664 marks.—In the competition for the new Technical College in the town of Thronbjørn, first prize was gained by Herr Ivar Cook, and second by Herr Henrik Bull, both architects of Christiania. However, both designs require certain modifications. All the designs sent in are now being exhibited.—The town of Flekkefjord, with several thousand inhabitants, is at length to get a modern sewerage system and supply of water. Hither the town has never!

BELGIUM AND HOLLAND.—A very artistic pageant was arranged in connexion with the annual Brussels fêtes, "Agriculture" being the subject

represented. The management was in the hands of the well-known painter, Gustave Den Duyts, who was supported by M. Jean Baes, the architect of the new Flemish Theatre, and the sculptor, Julien Dillens, whose work figure so conspicuously on modern examples of Belgian architecture.—The restoration of the Antwerp Cathedral is apparently being taken in hand energetically. The new woodwork on the fine old organ is alone to cost some 25,000*l.* The necessary funds have been voluntarily subscribed.—Some highly interesting excavations have been made near Bunnik, in Holland, where a Roman camp of large dimensions has apparently been found.

ELECTRIC STREET RAILWAY FOR BUDAPESTH.—According to a recent report of the United States Consul at Buda-Pesth, the Siemens-Halske electric street railway system, which was introduced into that city three and a-half years ago, is in operation on nearly seven miles of roads, having double lines. The electric current is transmitted from a central power station through an underground conduit, from which connection is made to the motor of the cars. Sixty cars, each seating thirty-two passengers, are run over the lines at an average speed of twelve miles an hour. The fares charged vary from 1*d.* to 2*d.*, according to distance. The cost of construction varies from 2,070*l.* to 10,350*l.* per mile of single track, according to completeness of track and quantity of cement used. The weight of cars, including motor, is 5 tons, and their cost 1,242*l.* The cost of running each car per mile, including employes thereon, fuel, labour at power station, maintenance of track, &c., is 43*d.* The rate of speed could easily be doubled, but the municipal regulations do not permit any increase. The service has been exceedingly satisfactory to the public, only short interruptions having been caused on a few occasions by unusually heavy falls of snow. The company working the system has obtained a concession for an extension of about three miles over some of the principal streets, and further concession will probably be secured.

MISCELLANEOUS.

THE GENERAL POST-OFFICE.—An upper floor is being built on the Post-Office (East), St. Martin's-le-Grand. It will, it seems, detract from the façade of Sir Robert Smirke's original building, which was erected in the interval 1855-9, and was opened ten years before the adoption of the penny post, of which the first despatch took place on the evening of February 2, 1839. A few years ago they robbed Smirke's building of its leading feature, the spacious central hall, entered through the portico, wherein letters used to be posted, the hall area being taken for the increasing needs of the department.

LOWES RACE COURSE.—Opportunity has been taken during the interval since the Spring Meeting of April 28-29, to make considerable changes for the comfort and convenience of visitors. A new stand, 106 ft. by 60 ft., with telegraph rooms, has been built, of red brick and flint, by Messrs. Longley & Son, of Crawley, after the designs of Messrs. Holland & Son, of Newmarket. The club and reserved enclosures in front of the stands have been raised in level by the laying down of about 3,500 tons of chalk, under the supervision of Mr. Cathcart, general manager to the proprietress, Mrs. J. F. Vernal, and a gangway has been made between the course-railings and the enclosures.

PUBLIC CLOCK, THURSTONE, NEAR PENISTONE, YORKSHIRE.—A new illuminated public clock, showing the time upon an external dial, 4 ft. 6 in. in diameter, has been erected in the new Water Tower of Messrs. Thomas Tomasson & Sons' manufactory at Thurstone, by Messrs. Wm. Potts & Sons, clock manufacturers, of Leeds. Mr. Stocks, of Huddersfield, is the architect of the building.

THE AMERICAN PRODUCTION OF PIG-IRON IN 1893.—According to the statistics of the American Iron and Steel Association, the output of pig-iron of the United States in the first six months of this year was 4,569,918 tons, against 4,387,317 tons in the second half of 1892, and 4,769,683 tons in the first half of last year. There was thus an increase of 175,601 tons, or 4 per cent., compared with the second half of 1892, but a decrease of 206,765 tons, or 4.3 per cent., compared with the first half of that year. The production of Bessemer pig-iron in the past six months was 2,374,890 tons, against 2,180,660 tons in the second half, and 2,543,345 tons in the first half, of 1892, which shows an increase of 185,104 tons, or 8.4 per cent., and of 120,545 tons, or 5.3 per cent., when compared with the two latter periods. The American iron trade being at present in a worse condition than it has ever been before, there is every indication that the out-put of pig-iron in the second half of this year will fall below that of the corresponding period of last year, and that the production of the current year will be much less than that of 1892. Notwithstanding that the number of furnaces in blast on June 30 last was only 245, against 253 on December 31, 1892, the output has been larger, and it is highly probable that their number will be reduced, especially as stocks of pig-iron are now larger than at the close of 1892.

RICHMOND HILLS.—Strong public opposition, by no means confined to Richmond and its locality, has

been raised to certain proposals recently submitted to the Richmond Town Council by the Dysart Trustees, having for their object the development of their extensive estates at Petersham and Ham. The proposals, which are now under the consideration of the Richmond Town Council, whose co-operation the trustees are seeking, are the outcome of an endeavour to secure a site for an isolation hospital for the boroughs of Richmond and Kingston, and the lease of Petersham meadows, to prevent their being built over. The trustees propose to hand over to the borough in perpetuity a considerable part of the meadows, and also to vest in the Town Council the rights of lords of the manor over Petersham common, except that part known as Petersham Wood, upon which it is proposed, by a suggested Act of Parliament, to extinguish the commonable rights so as to leave the trustees free to sell or let the land for building purposes. The scheme also embraces the making of a roadway on the bank of the river by the side of the Petersham meadows as far as Ham House, and it is likewise proposed that the Act shall enable the Trustees to close most of the footways in the neighbourhood of Ham House. The proposal to erect houses on the bit of woodland on the south side of the Star and Garter Hotel is strongly opposed, and it has been intimated to the trustees that any attempt to extinguish commonable rights or to close existing footpaths will be resisted to the utmost. There seems to be a diversity of opinion as to the extent to which building operations would affect the view from Richmond Hill and the park, though it is generally believed that the effect would be more or less damaging. The Richmond Town Council have rejected the scheme in its present form, though the correspondence and the whole subject have been referred to the Highway Committee for further consideration.—*Morning Post.*

CRYSTAL PALACE SCHOOL OF ENGINEERING.—On the 14th inst. the students belonging to the School of Practical Engineering at the Crystal Palace, received the certificates gained by them at the examination which took place at the end of the summer term. The chair was occupied, in the absence of Sir E. Carbutt through indisposition, by Mr. G. B. Roche, M.Inst.C.E., Chief Engineer of the London Chatham and Dover Railway. Prior to the distribution of the awards by the Chairman, Mr. R. G. Hodson (Superintendent of the Crystal Palace School of Art, Science, and Literature), stated that forty-seven students had attended the lectures on mechanical engineering, and of the forty-four who underwent the lecture examination on "Railways, their construction and appliances," thirty-one passed. The reports of Mr. J. F. Harrison with reference to the three mechanical branches of the school, that of Mr. W. Lawford on civil engineering, and the report of Mr. J. G. W. Aldridge as to the electrical section, all bore high testimony to the practical progress of the students, and referred in congratulatory terms to the success of the Principal, Mr. J. W. Wilson, and his staff of assistants. On the motion of Mr. E. Green, a vote of thanks was subsequently accorded to the examiners.

NEW BRICKWORKS AT NEWPORT, MONMOUTHSHIRE.—The opening of the new brickworks—or, rather, the extension to the old works—at St. Julian's, Newport, took place, says the *Western Mail*, on the 9th inst. The decision to extend the works was arrived at some two or three years ago, when a limited liability company was formed, with Messrs. C. H. Firbank (chairman), C. D. Phillips, and Thomas Parry as directors. The works are situated upon a piece of land 24½ acres in extent on the east side of the Usk. There is a plentiful supply of clay. The machinery and kilns are of the latest description, and the total weekly output of bricks, it is estimated, will not be less than 150,000.

REFUSE DESTROYER, GOVAN, N.B.—On the 10th inst. the new refuse destructor, which has been erected in Helen-street by the Police Commissioners of Govan, was opened by Provost Kirkwood. The building, which is situated at the head of Helen-street, is a two-story high and built of brick. The whole construction covers about five and half acres of ground, and the total cost is nearly 10,000*l.*, half of which sum was given for the ground. The refuse collected from the burgh is conveyed to the upper floor and tipped into the cells; it is then drawn on to the furnace bars, where it is consumed. There are six cells, each measuring 12 ft. in length, 5 ft. in breadth, and 3 ft. in depth, and two others are in course of construction. Provision has also been made for the erection of another destructor. The furnaces are charged from the back, and the gases which arise from the burning and green refuse are made to pass over the hottest part of the fire, and are thus destroyed. Warner valves or dampers are also provided, by which the escape of dust, papers, &c., is avoided. Each cell destroys three tons of refuse per day, but, owing to the incombustible nature of the refuse, they are not worked to the full capacity, each cell being capable of destroying about five tons. The temperature in the main flue is about 1,500 deg. Fahr. The system was devised by Messrs. Goddard, Massey, & Warner, of Nottingham.

WALTON PARK ESTATE, BRISTOL.—We are informed that Messrs. Richard J. Collier & Henderson have recently sold the remaining portion of the Walton Park Estate, near Bristol, for a sum approaching 9,000*l.*

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designated to be delivered.
*Enlargement of Asylum	North Wales County Lunatic Asylum	30 <i>l</i> . &c.	Dec. 2
Grammar School, Uldale, Carlisle	Rev. J. Greenwood,....	.....	No date

CONTRACTS

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Chapel and Sunday-school, Crown, Workop.	Trustees of the United Methodist-Free Church.	J. Alsopp	Aug. 22
Stables, Coach-house, & Hayrack, Hildesbury.	Rev. F. W. Kidway	do.	do.
Alterations to School Buildings, Durham.	Perkiss and Telford (J.D. & J.D.)	J. Gibson Cove	do.
Paving Material.	Reynolds Corporation.	J. A. Crowthor	do.
Public Hall, Cammeraters, N.B.	Rev. A. Stinch	do.	do.
Town Hall, Workshops, &c., Newcastle Institute, Haddington, Hilly.	Daver Town Council.	official.	do.
Re-lighting Alms-houses, Exeter street, Salisbury.	Lan.	do.	do.
Room Works, near Rotherham.	Southdown Sea-Corp	J. Harding & Son	Aug. 23
Artists' Hall, &c., Great East Street, London.	C. T. Copley	do.	Aug. 24
Gas-lights, &c., Great East Street, London.	Salisbury Corporation.	W. H. Sharp.	do.
Warehouses, Chapel street, Bradford, Yorks.	Lan.	T. Newbould	do.
Chapel, Street, &c., Huddersfield.	Chatterton Union	official.	do.
Additions to School Buildings, Horden, Healey.	John Lamb Corp.	do.	Aug. 25
Freshwater, St. Patrick's Chapel, Leeds.	Jno. Stalford	do.	Aug. 26
Stables, &c., near Frouse Lake.	H. M. Works.	S. Kelly	do.
Walls and Park-land.	Cromer Protection Corp.	J. C. Mellis	Aug. 29
Paving Works (Contract No. 11, Albham).	Bursi Corp.	F. S. Button	do.
Recesses, Works.	Corporation of Bursi.	C. S. Shaw	do.
Buildings, &c., Government and Municipal.	Bristol and Trent Corp.	official.	do.
Bell Bus, &c., Grawood, Deane street, Bolton.	Borough of Craydon.	do.	Aug. 30
Room Works, Rotherham.	R. N. Middle and C. C.	do.	do.
Buildings, &c., Rotherham.	Northumberland Corporation.	do.	do.
Street-lights, &c., Rotherham.	G. St. Peter Harris	do.	do.
Street-lights, &c., Rotherham.	J. H. Lees-Miles, J.P.	J. Rawlinson	do.
School Buildings, Grawood.	Rev. W. Joyner	Cobham & Cobham	do.

CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tend to be delivered
School Buildings, Pontypool.	Travethin School Bd	B. A. Landon	Aug 1
Forty-eight Cottages, near Cwm, Wales.	Griff Fawr House and Land Co	Official	do
Payne Twed and other Streets.	Superfund Corp.	do.	Sept 1
Additions to Schools, Pontnewydd, Newydd, Man.	The Year	Official	Sept 2
Stoneware Pipes.	Roof of Lland Beulah, Rh. R.	Official	Sept 2
Painting, &c. Girls' School, Sutton.	South Metro. School	Doane & Morgan	Sept 2
Fence at New Cemetery.	By Licensed Survey	Official	do.
Road Materials.	Wynn Cwrtell	E. J. Lysagrove	do.
Twelve Cottages, Gloucester road, Barn-	Maddocks T.R. & A.	do.	Sept 5
Adm. inst. Sch. of Science and Art	H. Ballinger	W. C. Oliver	do.
Quay Works, Newhaven.	Bromley Local Board.	Potts, Son, & Hennings	do.
Sewers and Outfall Works, nr. Birmingham	Hampson and Deek	P. Wyle	Sept 6
Chapel, Bishop, Tufan.	King & Norton R. & A.	R. Gifford	Sept 9
Sewerage Works.	Welling School Bd.	Gutteridge	do.
Two New Walls.	Ware U.R. A.	Bailey-Denton, Son, & Barth	do.
Extension of Bridges, Amble.	Derby County Lunatic	S. J. Story	Sept 13
Building Providence Chapel.	N. E. Ry. Co.	Official	do.
Re-building Bishops Premises, Bawthorpe	Abbeys Hospd. Chilled	Smith & Cross	No date
School, near Wythe.	School Bd	do.	do.
Synagogue, New York, England, Sheffield	do.	do.	do.
Cr. wh. Dunamur-gardens, Belfast	Old Exptl Union	J. Ferguson	do.
Chapel, Scotch Newington	Wills and Drost Bank	do.	do.
Banquing Premises Gloucester	W. St. Department	G. M. Bailey	do.
Painting Works, Chester	do.	Official	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Building Inspector	Bartolo-on-Trent Corp.	1200.....	Aug. 22
*Surveyor & Assistant	Brooklyn Local Board	1500.....	Aug. 26
*Building Inspector	Newman Corporation	1500.....	Aug. 26
*Assistant Surveyor of Building	City Serv. Co. Inc.	1500.....	Aug. 30
*Chief of Works	Whitehall Acad. School	.....	.....
	Unl. Serv. Co.	\$2. 00. per week	No date

Those marked with an Asterisk (*) are advertised in this number. Competitions, p. iv. Contracts pp. iv., vi., and viii. Public Appointments, p. xviii.

SUBSIDENCE AT KELVIN BRIDGE, GLASGOW.—The *Glasgow Herald* states that the subsidence at Kelvin Bridge is extending in a somewhat alarming manner. When the original fracture in the bridge took place it was entirely to the northward, and on the north parapet. A new development, however, has since been taken place. There has been a new subsidence to the westward, affecting the south parapet. The masonry is showing signs of severing, and the cavity in the pavement and street is increasing. Notwithstanding the measures which have been taken to prop up the building at the south-west corner of the bridge, the subsidence is also extending there. Additional cracks are discernible, and the plate-glass windows show signs of displacement. The boring operations which have been proceeding for some time have reached a considerable distance below the foundation of the bridge. The solid rock has been reached at a depth of 15 ft. below the level of the stone. Mr. White, master of works, visited the scene of the subsidence a few days ago, and after a minute examination of the bridge and surroundings he stated that there is no immediate danger of a collapse, nor did he anticipate stoppage of the traffic. The cavity in the street, however, will necessitate the lifting of the bridge, and the work will be conducted during the night. These operations will be completed during the night.

LEGAL

DECISION UNDER THE METROPOLIS
MANAGEMENT ACT, 1862, AND THE
LONDON COUNCIL GENERAL POWERS
ACT, 1800.

At the W. London Police Court on the 11th inst., Mr. Haden Corser gave his decision in the case of the London County Council *v.* George Nixey, builder, of Broxholme-road, Fulham.

Mr. Chilvers, from the Solicitor's Department, appeared for the Council, and stated that Mr. Nixey had erected a building on the south-eastern side of Gowan Avenue, Fulham, at the corner of Munster-road, in advance of the general line of buildings in Gowan Avenue. The defendant appealed from the architect's certificate, and the Appeal Tribunal appointed Mr. Justice St. John to consider the case.

At 10.15 a.m. on the 28th, the Appeal General Powers were read, and the architect's certificate was confirmed the line laid down by the architect, but found as a fact that the site on which the building was erected had been laid out for building before the passing of the Act of 1860.

Mr. Moyes, barrister, who appeared for the defendant, contended that the building was in Munster-road, that being the road on which it

fronted, and that the architect had no power to decide as to which street the building was in, that being a question entirely for the magistrate. He also contended that the Appeal Tribunal having found, as a fact, that the site was laid out for building before 1890, the defendant's land came within the exemption contained in section 33 of the General Powers Act, 1890, and that the Council could not, therefore, obtain the order asked for.

The magistrate, in giving his decision, said he had looked at the cases which had been referred to by both sides, viz., *Spackman v. Plumstead District Council*, *Kingston v. Epsom*, and the *London County Council v. Cross* and *London County Council v. Mears*, and he was of opinion that from those decisions it was for the Superintending Architect to decide not only the general line of buildings but also in which street the building was situated, and that the present case was not an exception to how that applied to the present case, as that section only applied when the architect was laying out the general line of buildings in the front and side streets at the same time, but in the present case he had only to lay out the front and side streets in accordance with sections 75 of 25 and 26 Vic., cap. 102, and not under section 33, the Act of 1860, which did not take away any powers from the previous Act, and he therefore made an order for the demolition of so much of the building as was an obstruction to the advance of the general line of buildings. There was also a similar summons against Mr. Courtenay for erecting a building on the opposite side of Gowand Street. But this was adjourned *sine die*, as the magistrate considered that it was not his duty to give an opinion of the House of Lords in *Nixey's case*.

MEETINGS.

MONDAY, AUGUST 21.

Cambrian Archaeological Association.—Annual Meeting, Oswestry, Shropshire.

TUESDAY, AUGUST 22.
Cambrian Archaeological Association.—Annual Meeting, Oswestry (continued).

Glasgow Architectural Association.—Visit to Hutcheson-
town Free Church. 6 p.m.

WEDNESDAY, AUGUST 23.
Cambrian Archaeological Association.—Annual Meeting, Oswestry (continued).

THURSDAY, AUGUST 24.
Cambrian Archeological Association.—Annual Meeting, Oswestry (continued).

FRIDAY, AUGUST 25.
Cambrian Archaeological Association.—Annual Meeting. Oswestry (continued)

Liverpool Engineering Society.—Visit to the Mersey Aqueduct Tunnel and Norton Water Tower, by permission of the water engineer, Mr. Joseph Parry.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

21,070.—CLOSETS: A. J. Bessl (communicated).—This improvement relates to the class of closet in which the rim or flange of the lid enters a groove filled with water—water which is drawn off by the flange of the lid when the lid is turned sideways. The object of the invention is to provide a mechanism for moving the lid automatically and in connection with the raising or lowering of the seat, so that the lid can lie flat, or up, or down, or can lie flat, the flange of the lid, the flange of the seat, the channels for making the seal, is so connected mechanically with the flaps of the closet that the raising or lowering of the seat will raise or lower the lid.

24,462.—CLOSET OR BATHTOP TAPS, SEATS, OR RIMS: H. Sutcliffe.—This invention is designed to obviate the danger of injury to delicate persons from bodily contact with the rim of a closet or bath, or the seat of a closet, by character. In order to effect this the inventor makes the upper surface of the seat, rim, or top, of cork or powdered cork, or of any other soft material which will not neutralise the warmth of the body.

15,264.—SPOKESHAVES: *R. Stevens*.—This invention relates to spokeshaves for working wood, and is designed to preserve the stock, maintaining a uniform pitch of blade, and to prevent the latter flying out when in contact with a knot or the like. The metallic blade is provided at each end with a screwed stem, which passes through the stock, being secured thereto by winged or other nuts. The front side of the stock is provided with holes or openings, in which are disposed buffers of india-rubber or other pliable material, through which the screwed stems pass.

75,934.—DECORATING TILES, BRICKS, POTTERY, AND PORCELAIN: *John Bilton*.—According to this invention the ornament is first cut as a stencil on a sheet of thin metal. This plate is then placed on a sheet of paper, or other suitable material, and liquid clay rubbed through it so as to adhere. By applying this paper, with pattern, to the unfixed tile, &c., the design is transferred from the paper to the surface of the former.

20,059.—**SLIDING AND SWINGING WINDOW-SASHES AND FRAMES: H. J. Ford.**—This invention relates to that class of window-sashes which, while usually intended to slide in their frames, are also so fitted that they may be swung about one of their side edges when desired, for instance, for cleaning or moving large articles in or out. This object is effected by providing the sashes on one side with hinges of improved type, and making sundry modifications in the inside face linings, &c.

NEW APPLICATIONS FOR LETTERS PATENT.

JULY 31.—14,659, J. Sheldon, Fasteners for Window-sashes, French Windows, Shutters, &c. — 14,663, V. Cotton, Portable Carving Bench.

AUGUST 1.—14,715, E. Harcourt, Bell Pull Arrangement for Electric Bells.—14,718, J. Judd, Expanding and Contracting Door, Window, Shop-Front Guards, &c.—14,738, J. Flannery and S. Terry, Ventilation of Enclosed Spaces.—14,742, F. Plumstead and H. Hunter, Electric-Light Fittings.—14,760, W. and E. Freeman, Soil-pipes and Ventilating Shafts.

AUGUST 2-14, 1777. T. Whitehead, Construction of
Outlet Ventilators for Buildings.—14,820, W. Eckstein
and J. Willmore, Manger Fittings for Stables

House, The Marsh, Newbury, for the Newbury Brewery	
Mr. Jas. H. Money, architect, Newbury:—	
Taylor & Son.....	£345
Head	375
	W. H. Harrison, Newbury * £335
	* Accepted.

INGTON.—For erecting a new vicarage house at Stoke Newington, near Palginton, South Devon, Mr. W. T. Allen, architect—

Messrs Bastow & Co.,		W. Trevena	£1,797
"	£2,059	T. Brooks	1,790
"	1,995	Rabbitt & Brown	1,641

(Jas. H. Money, architect, Newbury. No quantities supplied.)
 Builders' Plumbers' P
 Work. Work. Gal
 Pope & Co. 5,800 0 1,178 0
 Geo. Elm 1,714 59 295 19
 A. H. Houghton, Donnington 1,29 0 199 0
 L.

[illegible]

Peak, E. I. Road	ton	9/10	0/10	0/10	Saint, Porto Rico	0/10	0/10
Acquella, A. I.	100	9/10	15/10	4/10	Saint, Italian	0/10	0/10
Sh. Canada load	2	2/10	3/10	5/10	METALS.		
Rich, C. I.	100	10/10	10/10	10/10	Iron—In 8 Scot.		
Im, do.	100	3/10	4/10	4/10	Bar, Welsh, in	2 1/2	0/10
Rig, Dantsic, dec.	1	1/10	1/10	1/10	London	5/17 1/2	6/10
Canada, Dec.	100	10/10	7/10	7/10	in Wales	5/17 1/2	6/10
Rich, C. I.	100	10/10	10/10	10/10	in London	6/10	6/10
Yellow	100	4/10	4/10	4/10	COPPER—British,		
Rig, Dantsic, fath	100	10/10	10/10	10/10	cake	45/10	45/10
Rich, C. I.	100	10/10	10/10	10/10	Best selected	45/10	45/10
aincot, Rig,	100	2/10	2/10	2/10	Saint, strong	45/10	45/10
Finland	100	10/10	10/10	10/10	Chili, bar	54/10	5/10
do. 43 & grad	100	7/10	7/10	7/10	HOLLAND METALS	0/10	0/10
do. Rig	100	7/10	8/10	8/10	Spanish—	10/10	10/10
Yellow	100	9/10	9/10	9/10	Iron—com.	10/10	10/10
White	100	10/10	10/10	10/10	Sheet, English	10/10	10/10
do. white	100	10/10	10/10	10/10	8 lbs per sq	10/10	10/10
Sweden	100	7/10	15/10	15/10	and upwards	17/10	0/10
Canada, Pine	100	10/10	10/10	10/10	Sheet	12/10	0/10
do. do.	100	10/10	10/10	10/10	Zinc—	21/10	0/10
Canada, Pine	100	10/10	10/10	10/10	pipe—ton	21/10	0/10
do. Spruce	100	10/10	10/10	10/10	tags	22/10	0/10
do.	100	10/10	10/10	10/10	TR—Strait	78/10	80/10
do.	100	10/10	10/10	10/10	do. do.	80/10	80/10
do.	100	10/10	10/10	10/10	English Ingots	80/10	87/10
do.	100	10/10	10/10	10/10	do. do.	80/10	87/10
do.	100	10/10	10/10	10/10	Billion	80/10	87/10
do.	100	10/10	10/10	10/10	OILS.		
do.	100	10/10	10/10	10/10	Lined	21/10	21/10
do.	100	10/10	10/10	10/10	Coconut, Coch	20/10	0/10
do.	100	10/10	10/10	10/10	do. do.	20/10	20/10
do.	100	10/10	10/10	10/10	Palm, Laos	20/10	20/10
do.	100	10/10	10/10	10/10	Reaped, English	20/10	20/10
do.	100	10/10	10/10	10/10	do. brown	24/10	0/10
do.	100	10/10	10/10	10/10	do. do.	23/10	22/10
do.	100	10/10	10/10	10/10	do. do.	23/10	22/10
do.	100	10/10	10/10	10/10	Lubricating, U.S.	4/10	5/10
do.	100	10/10	10/10	10/10	do. do.	4/10	5/10
do.	100	10/10	10/10	10/10	TR—Stockholm	0/10	0/10
do.	100	10/10	10/10	10/10	Archeval	0/10	0/10

After quailers	0/40	0/40	Linsed	21/00	21/00
Am. Honduras, &c	0/40	0/40	Long	21/00	21/00
hogany, Cuba	0/40	0/40	Do. Ceylon	20 1/2 00	20 1/2 00
Comuna	0/40	0/40	Palm, Laos	20 1/2 00	20 1/2 00
in cargo	1/3	1/6	Rapesed, English		
Mexican do. do.	3/31	1/6	Do. brown	22 1/2 00	22 1/2 00
Tobacco do. do.	2/31	1/6	Cottonseed ref.	21/00	21 1/2 00
do. do. do.	2/31	1/6	do. do.	21/00	21 1/2 00
Turkey ton	4/00	3/50	Lubricating	22/00	23 1/2 00
do. do. do.	4/00	3/00	Do. refined	5/20	22/00
do. do. do.	4/00	28/00	TAR - Stockholm	0/12 1/2	0/12 1/2
do. do. do.	0/06	0/12	Archeangel	0/12 1/2	0/12 1/2
do. do. do.	0/06	0/12			

ST. ALBANS.—For sewerage, paving, channelling, &c., Albion-road, for the Corporation. Mr. George Ford, City Surveyor, Victoria Street, St. Albans.
James D. Voss £203
George Capper, St. Albans (Accepted) £465

TEILBURY (Gloucestershire).—For the construction of water-works. Mr. T. Holloway, surveyor, Chippenham, Wilts. Quantities by the Engineer.—

	Accepted	Engine House, and Pumping in Reservoir, Machinery.
Easton & Anderson	£208 6 6	£250 0
Clay Cross Co.	1,100 7 11	775 17 7
T. Evans	—	635 0
Waller & Co., Southwark, S.E.	—	547 0
H. Thorpe & Co.	—	64 0
H. T. P.	241 0 0	613 0 0
W. W. Gardner, Teitbury	495 12 6	158 0
Crowley & Co.	12 0	675 18 0
Thos. T. A.	4,532 10 0	864 0
Chilwell & Co.	—	772 0
W. R. Brown	—	098 0
Hughes & Gorton	104 11 2	758 2 3
Mitchell & Thompson	442 10 3	1,145 4 5
Lloyd & Powell	62 2 5	713 11 9
J. S. Brown	924 17 3	—
Downing & Rudman, Chippenham ..	—	677 17 0
C. S. Houghrough	1,138 7 11	741 2 4

Two tables here holds post in deep, done by Messrs. Timmins, of Runcorn under separate contract.

THATCHAM. Accepted for new offices for Mr. Edward Mezey, at Thatcham, Berks. Mr. Jas. H. Money, architect, Newbury — A. Bailey, Thatcham £200 0 0

WATFORD.—For widening a bridge for the Hertford County Council. Mr. Urban A. Smith, County Surveyor, 28, Victoria-street, London, S.W.
Wilkinson Bros. £1,577
T. N. Neave 1,580 1,750 | Dave & Co. £4,545 F. Duport | 1,535 1,431 || J. Jackson | 1,750 | G. Double | 1,431 |
| H. J. Rogers | 1,045 | Jas. Dickson, St. Albans .. | 1,350 |

* Accepted.

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16. Wells	17. Ely	18. London	19. Ripon	20. Chester
21. Llanthony	22. Hereford	23. Manchester	24. Ely	25. Durham
26. Salisbury	27. Chichester	28. St. Asaph	29. Winchester	30. Bath
31. Bristol	32. Ely	33. Winchester	34. Bath	35. Durham

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VOL. LXXV. NO. 2638.

APRIL 15, 1893.

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Technical Instruction in Woodwork.



THE first sight it might seem that books must be of very little value in teaching or in assisting in teaching the craft of working in wood, but we have before us several books* on various aspects of woodworking which possess a value for both teachers and scholars. Technical instruction in woodwork, as now practised, is given for two distinct purposes: first, for the education of hand and eye without any necessary intention of the skill in woodwork obtained being exerted for a means of livelihood, and, second, for the training of a craftsman so that he may the better be enabled to earn his daily bread. The recent adoption of manual training as a part of education in higher grade or secondary schools, has, or should have, always in view the first only of these purposes, but if we were to judge merely from Mr. Barter's "Woodwork," or Mr. Degerdon's "Grammar of Woodwork," we might be inclined to feel that the short-sighted utilitarianism of the average Englishman, who wants his boys to get what he calls practical knowledge, has already operated injuriously on the character of the manual training now given in schools. For the school teaching of boys, whose future careers will certainly widely differ, and are for the most part undetermined, there can be no question that the system of manual training to be preferred is that which will give the fullest development to hand and eye. As Mr. Ricks very rightly says in his preface to Mr. Barter's book, "the essence of manual training lies in the *practice* and not in the *production*; in the *doing*, not in the *thing done*!" and its purpose is "to awaken and train the artistic faculties, and direct the child's instincts towards the beautiful and true." This being so, the system

of manual training in woodwork advocated by Mr. Barter and Mr. Degerdon has for competitors not only drawing and modelling in clay, both of which have their champions, but also the Swedish Slöjd, which we have seen at work in some English schools. As between drawing and modelling on the one hand and some form of woodwork on the other we think it may be fairly claimed that woodwork not only bears the palm for superiority of interest to the scholars in the generality of cases but will, when rightly conducted, give better education to hand and eye in a limited time. The superiority of interest results partly from the absence of drudgery which is almost an inevitable concomitant of early drawing lessons, and still more from the active physical exercise and the greater change from ordinary school work. The better education in a limited time must also be admitted by impartial observers, although it by no means follows that the highest level reached by means of woodwork will in any way attain to the fullest results obtained by an extended course of instruction in drawing and modelling.

Taking it for granted that for the manual training, or, more properly, the education of hand and eye of boys at school, some form or other of woodwork is most generally advisable, we may next consider what system of instruction is likely to give the best results, bearing always in mind that the best result is not the production of a number of young amateur carpenters, joiners, or wood-carvers, but the development of the hand and eye of all the scholars, so that they may have a better appreciation both of beauty and truthfulness in form, greater dexterity of hand and wrist, and a readiness of resource to fit the means to the end in any manual occupation, artistic or utilitarian, which may come to their lot either as work or pastime in future life.

The various competitive systems in vogue in this country may be taken as wood-carving, the Swedish Slöjd, and the English Sloyd, as the systems set forth by Mr. Barter and Mr. Degerdon may be called. The case for the English Sloyd is well argued by Mr. Barter, though naturally from an *ex-parte* point of view. The disadvantages of wood-carving, as set forth by Mr. Barter, are, insufficient variety of tools, difficulty of grading

the exercises, cramped position of the pupil, the teaching of "only art drawing, and of that but a small amount." Of these objections that of the cramped position may, to a partial extent, be admitted, though even this may be lessened by a judicious selection of exercises. The difficulty of gradation and limitation of drawing will neither of them be admitted by anyone who has made practical acquaintance with the immense range of carving studies, from simple "chip carving" to figure work, that can be successfully taught. The limitation of the variety of tools to the numerous forms of chisels and gouges employed in carving introduces us to a strong point of difference between the English Sloyd and other forms of woodwork with which we shall deal presently. On the other hand it must be admitted, by all impartial observers, that wood carving is invaluable as a means of producing suppleness of hand and wrist, and as a training in the value of curved line and of varied planes of surface; that is of beauty of form, light, and shade, and so of the artistic perception. Inasmuch as the English Sloyd, advocated by Mr. Barter, conflicts principally with the Swedish Slöjd, we find the objections to the older and foreign system forcibly stated. Firstly, it is alleged that "the Slöjd system is distinctly defective in the association and the quality of the drawing involved. The work is done more from the model than from the drawing of the model, and too many of the models give the most indifferent opportunities for drawing lessons." On comparing a set of the Slöjd models with those illustrated by Mr. Barter, we are struck with the fact that those of the former system possess forms which cannot be adequately drawn in a geometrical fashion, by reason of the predominance of curved surfaces. The earliest model is a small pointer of circular section of diminishing diameter, whilst the spoon, to which Mr. Barter refers as a "prominent model," is wholly composed of curved surfaces of constantly changing curvature. This model Mr. Barter especially objurgates from the length of time taken in its production, which he states is from seven to nine hours for a man, and fourteen to eighteen hours for a boy. This is condemned as furnishing only one drawing lesson, but we think that the train-

* "Woodwork" (The English Sloyd), by S. Barter; Preface by George Ricks, B.Sc. Lond. London: Whitaker & Co. "The Grammar of Woodwork," by Walter E. Degerdon. London: Macmillan & Co. "The Principles of Pattern-Making," by a Foreman Pattern-Maker. London: Whitaker & Co. "The Carpenter and Joiner," by various Experts and Authorities; Edited by Robert Scott Burn. London: Ward, Lock, Bowden, & Co.

ing of that one drawing lesson in the sense of form and the value of refined gradation of curved surface is invaluable, and supplies an element in which the whole series of lessons included in the English Sloyd is deficient. Any pupil who has once produced accurately such a model has thereby learnt as much as is possible to be learnt from woodwork of the meaning and value of form and of the right judgment of truthfulness of line. Both hand and eye must be very highly trained when such work as this model is possible to a student. Another point on which Mr. Barter speaks strongly is the class of tool employed, and here he particularly falls foul of the famous Sloyd knife. As a counterpoise to the knife is advocated the chisel, but it is apparently forgotten that a knife is always to be found in the pocket of an English schoolboy and not a chisel, and that so far from the knife being an "unfamiliar" tool, it is the chisel rather which would be so designated by the majority of the pupils. Again, a knife is capable of being used for the production of curved surfaces far more readily than a chisel, but here once more we touch on a vital point of difference between the Swedish and the English system. Another objection raised is that "in the more advanced Sloyd models the use of too many tools is involved." This is somewhat inconsistent reasoning for an advocate who condemns carving for its paucity of variety in tools.

Having thus dealt with the objections raised to the competitors of the English Sloyd we may now touch upon what appear to us as inherent defects in the methods advocated by our English teachers. First, the tools. These are wholly the usual tools of the carpenter and joiner, and the system appears to attach too much importance to teaching boys the use of the mechanic's tools rather than the training of hand and eye in a general sense. Sawing, planing, paring, and the use of the centre-bit are, in fact, the extent of the knowledge obtained, in addition to some simple geometrical drawing. Accuracy and precision, it must be admitted, are well inculcated, but this accuracy and precision are the result of the use of rule, compass, and square, not of correct unaided judgment of eye. In this respect, therefore, as a training of the eye, English Sloyd is distinctly inferior to both carving and the Swedish Sloyd. The limitation of the models to straight lines and, with hardly any exception, right planes and circular curves, is of far less value as an education of the eye than the graduated curved surfaces of the latter systems. In these two points, therefore, lie the deficiencies of the English Sloyd, the limitation of the tools to those of the mechanical work of the carpenter and joiner and the limitation of the models to geometrical forms. The system is, in short, an admirable preparation for the workshop, chiefly for that of the carpenter and joiner, but also, though to a lesser extent, for that of the engineering mechanic. Apart from this, it is deficient in the education of the hand in deftness and suppleness, of the eye in accuracy, and, above all, of the artistic sensibility.

Taking the English Sloyd system as it stands, we have nothing but praise for the admirable way in which it is set forth in Mr. Barter's book, which should be in the library of every young carpenter and joiner, and contains information, important for every young architect, very clearly and concisely expressed. The various kinds of timber and the tools employed by the carpenter are very well described, and the proper methods of sharpening and using tools are made perfectly intelligible by photographic illustrations of the tools in the hands of a workman. The series of models of which the system of teaching consists, is well chosen for the attainment of the object in view, the skillful use of the joiner's tools, and the knowledge obtained, would be useful either for a professional or an amateur mechanic in wood. It is, however, beside the mark for Mr. Barter to leave it to be inferred that the thirty models

which he includes in his series could be executed by any schoolboy in the time of 330 hours, which, in his introduction, he states is all that can be allowed from ordinary school work. There are, too, several models given which, in our judgment, would occupy a boy even longer than the Swedish Sloyd spoon to which we have before referred, and we must conclude that the English Sloyd has no advantage over the Swedish in point of time required for the course.

We have endeavoured to judge fairly between the English Sloyd, as set forth by Mr. Barter, and the Swedish system, and have taken care to investigate this latter before coming to the opinions we have expressed. Mr. Barter's book is so charming that at first we were fascinated by the author's plausibility, but the severe strictures passed upon other systems naturally suggest the thought that a somewhat partisan view is taken of the competitors of the English Sloyd.

To the architect the final chapter on the workroom and its fittings is particularly valuable at a time when so many technical institutes are springing up around us.

Turning now to the system of manual woodwork instruction advocated by Mr. Degerdon, and based upon the practice of the Whitechapel Craft School under his direction, we find practically the same objects kept in view as by Mr. Barter, with this difference, that as the time at the disposal of the teacher is presumed to be limited to 120 hours, the course is shorter, and the exercises simpler. The twenty-one lessons included in the course would, however, require very sharp work on the part of a boy to complete in 120 hours. We have the same results of the training as in the former case, though in a lesser degree, a certain amount of skill in the use of the simpler tools of the joiner, a certain amount of knowledge of simple geometrical drawing, but the same reliance on gauge, rule, and square, and, consequently, the same limited education for the eye as well as for the hand. The means employed and the manner in which they are set forth are admirable for the limited purpose and scope in view, but there is not that satisfactory training for hand and eye that should be the first object of manual instruction, and which is quite unattainable without less reliance upon tools and instruments of measurement.

In *The Principles of Pattern-Making* we have a strictly technical work on a special branch of woodwork, produced not for any purpose of general information, but for the special advantage of a particular specialised craft. Addressed to and intended primarily for the young pattern-maker, it is of considerable interest and value to the engineer, the architect, the builder, or whoever has to design or determine the form of metal castings. By a careful perusal of this work much may be learnt of the practice of the foundry and of the points which tend to increase or decrease the cost of castings, to augment or lessen the strength of cast work, and to lay the foundation of that knowledge of technique which is at the basis of all design, whether æsthetic or utilitarian. The point of view from which the subject is treated being, however, rather that of the engineering pattern-maker than the sculptor, we must not expect, nor do we find, that much notice is taken of ornamental metal-casting. The first principles and materials are explained lucidly, and the short account of the tools used by the pattern-maker will be useful for the tyro. The various methods of jointing patterns, both for the purpose of rendering them capable of withdrawal from the moulds, and in order to obtain the necessary strength for the rough usage of the foundry operations, and for resisting the variations of temperature and humidity to which they are subject, are well explained by the description of the actual process of making patterns for definite purposes; and, though it would be manifestly impossible within the limits of such a work to describe all the possible examples with which a

pattern-maker might have to deal, amply sufficient instances are given to include the fundamental principles, so as to enable the young workman to apply them to any particular piece of work. Not the least valuable part of the book is the glossary of terms used in the foundry and pattern-shop, which will be found serviceable not only to the pattern-maker, but also to the designer of cast-metal work. This book we may, in short, characterise as a model work for the technical craftsman.

A number of papers which have appeared from time to time in the *Technical Journal and Industrial Self-Instructor*, and are now incorporated in the work entitled "The Carpenter and Joiner," may be taken as an illustration of the kind of information that is to assist the self-instructing mechanic to supplement the deficiencies of the present-day system, or, perhaps more correctly, we ought to say, lack of system, under which the modern carpenter and joiner picks up his trade now that the old-fashioned method of apprenticeship has, practically, passed away. We are glad to note that an attempt is made to explain to the young carpenter the *raison d'être* of the particular forms which various joints and other parts of timber construction have assumed for statistical and mechanical reasons, whether arrived at by process of thought or by experience, as it cannot be too often remembered that the point in which the modern British workman is, above all, apt to be deficient, is an intelligent and rational comprehension of the principles which underlie his daily practice. It is not, however, of real advantage to explain these principles by hypothetical accounts of primeval woodwork, especially when the hypotheses that are stated as historic facts are, as in the case we are considering, archæologically incorrect.

Those who prepare books of instruction for the use of operative workmen, whose general education, even in these days of Board Schools, is usually somewhat defective, and who are unable, in many cases, to verify the truth of dogmatic assertions, should always be particularly careful that such assertions should be absolutely and rigidly true. Thus, to say that "the trussing of beams has for its principal object the providing against the tensile strain to which it may be subjected," obscures and ignores the fact that a truss, properly so called, necessarily entails that at least one of its members shall be subject to a tensile strain. Of course, the trussing of beams is intended to strengthen them against cross strain, and it is a pity to lead the mind of a young carpenter to confuse tensile and cross strain. Nay, more; we might use the words of Napoleon and say, "it is worse than a crime, it is a blunder."

The work now before us contains so many instances of modes of construction not universally known, and but infrequently described, that it is perhaps a little hypercritical to say that there are some omitted which ought to have been included; but the producers of new works for the technical craftsman should always endeavour to introduce as much modernity as possible, to be, in current phrase, up to date. Thus, in describing the strengthening of beams, account might be taken not only of Delorme's method of building up curved beams by layers of boards one above the other, but also of the cognate device of putting the boards side by side. Again, the simple means of building up a deep beam, used sometimes in America, but little known in this country, by placing two beams, of moderate depth, one over the other and connecting by boards nailed diagonally to their sides, is a cheap and very strong piece of construction. In the use of herring-bone strutting, the practice of putting the crossing battens flatwise instead of upright is one which is scientifically superior to the ordinary method in the stiffening of our thin and deep modern joists.

As a further instance of archæological inaccuracy we find repeated the popular

fallacy that Mansard (or Mansart) invented the form of roof generally known by his name, whereas, just as in the case of Palladio and the pulvinated frieze, the truth is, that he popularised the form of roof already invented. In speaking of mansard roofs we are reminded of a point in their actual working which is important to the carpenter, the method of finding the "cuts" for the rafters, especially jack rafters, when hips are introduced. One of the details which distinguish the expert carpenter from the bungler is the knowledge of solid geometry which enables the skilled workman to save so large an amount of time as compared with the tyro.

Every book purporting to be a means of instruction for the worker in wood should, one would think, give a clear, and, as far as space permits, a full account of the various woods that are likely to come within the province of the worker, or, at the least, should refer him to other and fuller sources from which he can get the necessary information. Instead of discoursing at length, in vague terms, on the value of a knowledge of different kinds of wood, it would be better to give some substantial hints of that knowledge, which can hardly be said to be done, when, for example, the account of mahogany is limited to twenty-five words.

In any account of the work of the joiner, as distinguished from that of the carpenter, an explanation of the various ways of forming joints or connexions between different parts is of paramount importance, and we are pleased to see, in the work before us, that this vital subject is well and adequately treated. The description of staircasing and handrailing is also good as an introduction to perhaps the most difficult work of the joiner, and reference is made to other works by which the young aspirant may further pursue his studies. The work of the joiner cannot be said, however, to be in any sense fully treated, though, as an introduction thereto, the quality of the information given is satisfactory.

Design plays a more prominent part in joinery than in carpentry, and it is in the matter of design that so many books fail just as does the one we are now taking for our text. It is a matter much to be regretted that this should be so, as every bad design which sees the light, whether on paper or in actual execution, vitiates the taste of our countrymen in general, and renders them still less averse to the toleration of ugliness, which even more than the want of appreciation of beauty is, as Mr. Gladstone has pointed out, and as all careful observers must admit, a remarkable trait of the British mind. In the present case the character of the designs is not only bad, but the badness has not even the feeling of modernity, it is the badness of the stop-chamber period of design, and hence is antiquated and out of date. The ideal work of reference and instruction for the carpenter and joiner has, we fear, yet to be written, and the modern Nicholson must be a man combining very varied abilities, as well as a wide range of knowledge, such as are possessed by very few men indeed who have sufficient time at their disposal for the purpose.

ARMAGH CATHEDRAL.—We hear that Mr. Thomas Drew, R.H.A., F.R.I.B.A., of Clare-street, Dublin, has been appointed Consulting Architect to Armagh Cathedral, in succession to the late Mr. Carpenter.

ORDNANCE SURVEY MAPS.—We are informed that the Board of Agriculture desire to give notice that arrangements have recently been made by which the latest issues of the Ordnance Survey Maps on the 1-in. and 6-in. scales have been made available for inspection by the public at the Offices of the Board at 3, St. James's-square, S.W. Changes in the boundaries of boroughs, of Local Government districts, and of parishes, will be recorded on the 6-in. maps as soon as possible after they have been authorised, and a complete set of the index maps and indices of all Ordnance Survey Maps and publications will be kept in hand for reference. The Board have reason to believe that the facilities for inspection thus afforded will be found to be of general public utility.

COLOUR DECORATION AT THE CHICAGO EXHIBITION.

PERHAPS the most satisfactory thing in connexion with the colour decoration at the Chicago Exhibition lies in the fact that the exhibits are all on the buildings and in the places for which they were designed, and they are all executed by American artists acting in concord with the architects of the buildings, and under the supreme control of Mr. F. D. Millet, the Director of Colour, who is himself, besides being a painter of no ordinary merit, a capable decorative artist, as his work on the buildings show. It may be remembered that his picture was purchased by the Chantrey Bequest last year, and he is a frequent exhibitor to our own Royal Academy, besides being a member of the Royal Institute of Painters in Water-Colours. The Assistant Director of Colour is Mr. W. T. Turner, also an artist of the best standing in the States. Under such leadership, and acting in concert with each other, it might have been expected that decorative art would have been well represented at the Exhibition, especially as money, although not too liberally supplied, was granted with sufficient generosity to admit of a good show being made. It was fortunate, too, that the buildings seem in most cases to have been designed for colour treatment. They are laid out on Renaissance lines, with their chief points emphasised by pavilions containing domes or tympani eminently suitable for such treatment, or which have colonnades whose inner wall lends itself admirably to colour treatment, which, while placed in these positions is sufficiently protected from the weather, and also acts as a background for the architectural features in front of it. Decorative art was exhibited to a large extent at the late Paris Exhibition, as in the Central Hall of the Fine Arts Building, by contributions sent by various artists, but it had this great drawback, that it was sent as an oil picture might be sent to a picture show, and could not form part of the building which it was intended to decorate. This was only in the main, however, for the great central dome was elaborately finished in fresco and also other parts of the main buildings; but no such general scheme seems to have been adopted as at Chicago, and this, no doubt, was partly on account of the architecture adopted, which did not lend itself to the application of colour.

It is fortunate that the American decorative artists have risen to the occasion, and have shown that they are able to cope with problems of decorative art so as to be in harmony with the architecture which it adorns, and it is needless to say that henceforth decorative art as an aid to architectural effect should take its stand along with sculpture and the other allied arts, and that American decorative artists should be a factor in American art.

Mr. Millet seems to have been fortunate in surrounding himself with a band of men who have had some considerable training in France and Belgium, and who besides have been employed in America on certain modern buildings in which the employment of decorative art has been seriously undertaken; for instance, Mr. Blashfield, who has executed work on the Manufactures Building, as will be noted, studied with Mr. Millet himself in Paris and Antwerp, and has decorated the sumptuous Hotel Waldorf at New York, lately erected by Mr. Astor, the millionaire; also a new hotel in Florida, and other large buildings.

The most monumental building on the grounds, viz., the Administration Building, by Mr. Hunt, is, perhaps, the least fortunate as to its colour decoration of all the buildings. The interior has been carried out by Mr. W. L. Dodge, and, as before hinted at, the poor result may be because of the structural reasons necessitating the use of electric light during the execution. This may, perhaps, account for the light key which has been adopted, and which is not

sufficiently strong for a monumental building of this proportion; the general treatment of the ground work is light buff, with the mouldings picked out in gold. The panels over the great circular arches contain reclining white angles on a light blue ground, supporting a name panel between them above in the loggia story, and forming the drum of the dome. The space between the pilasters is painted a light red terra-cotta colour; while the inner dome is treated in light blue and gold, and has a washed-out appearance; while beyond in the outer dome, and seen through the 50-ft. opening of the inner one, is a realistic representation of Apollo distributing garlands to figures representing Arts and Sciences, which are grouped around him. This, no doubt, was a difficult space to treat, especially as it is impossible to see more than a quarter of the composition at one time from the ground level; then why take a subject which requires you shall see it all before you can understand it? Some subject simpler in its composition and broader in its treatment might, we think, have been more satisfactory.

The outside of the building has, in conformity with the scheme formulated by the architects of the buildings abutting on the Court of Honour, been left white, with the exception that the wall behind the colonnade is painted a rich Pompeian red, which serves in a fine way to show up the Ionic columns to the loggia story, and to give light and shade to the whole design.

There is only one building which has been designed from its very inception and carried out for the purpose of colour decoration, and that is the Transportation Building, by Messrs. Adler & Sullivan, where the whole interior surface is so treated; this we shall treat of presently. The Manufactures Building, by Mr. Post, of New York, seemed to lend itself admirably to the purpose of colour decoration in its accepted usage. At well-defined points in the covered ambulatory which encircles the building, and which is just about a mile in length, are eight domes, two on each façade; and eight semi-circular tympani, two at each angle, which lend themselves specially to the treatment of subjects dealing with manufactures and liberal arts. Eight artists have been employed on these, and it is not too much to say that, although one at least of the designs is crude in its conception and badly executed from a decorative point of view, the rest are well-conceived and well-executed. Commencing at the north-west corner, Mr. F. D. Millet himself leads off with two subjects, one in each of the semi-circular spaces below the dome. One represents Penelope and her weaving machine, while in the other is portrayed the return of Ulysses; these two compositions are good and quiet in tone, and therefore not contrasting too rudely with the surrounding whiteness of the architecture. The draperies are well rendered in light pinks, yellows, and blues, while the figures are handled in a broad, flat manner, which is very suitable.

Continuing round the building, we find that the domes on either side of the north entrance are treated respectively by Mr. T. G. Beckwith and Mr. Walter Shirlaw. These domes have four semi-circular arches cutting into them where the entrances and ambulatories cross one another.

Throughout the building where these occur, artists have placed figures in the spaces formed by the meeting of the semi-circular arches, and often by garlands and angels connecting these. In that by Mr. Beckwith the subject taken is "Electricity," one figure having an electric motor, another working an electric telegraph, while a figure representing Electricity in a flash of lightning is placed at the top of the dome. Mr. Shirlaw, in the next, represents allegorical figures of gold, silver, pearl, and coral rising from the corners on a gold ground. Coming to the north-east corner, the two tympani are representative of pottery and glass-blowing, and are by Mr. L. C. Earle. These, and especially that of

glass-blowing, are perhaps the worst on the building and show no real decorative treatment, being executed in coarse black colours as an easel painting with strong effects of light and shade. The domes over the angle pavilions are in every case very badly handled. They are spherical, like the side ones, with semi-circular arches cutting into the four sides, the two facing the ambulatory being occupied by the paintings, the two outer ones being open. The dome itself is treated with a blue ground, and coarse gold chains of a very ordinary pattern are painted in gold and follow round in horizontal directions, the whole being exceedingly bad and coarse in detail.

These were all executed by a "firm" which perhaps accounts for it. The next two domes are by Mr. G. E. Simmons and Mr. Kenyon Cox, the latter best known as an illustrative black and white artist in the *Century* and other illustrated periodicals. His figures represent textile fabrics, ceramics, metal work, and building, and show four figures appropriately treated with different coloured drapery, the space above being treated as a cloudy sky. It is as satisfactory as any of the domes, while the reverse must be said of the other artist's work.

At the south-east angle Mr. Walter MacEwen, who has studied in Paris, has taken the subject of music. The scheme is thoroughly French, of the best class and harmonises well.

Turning the corner and coming to the centre of the south façade we find the two domes are executed by Mr. T. Alden Weir and Mr. Robert Reid. In the first, four figures on pedestals representing Decorative art, Painting, Goldsmiths' art, and the Art of Poetry are seated at the angles, with a boy-subject between holding a shield. The skin is of a deepish yellow, while the colouring of the drapery is rich while subdued. In the adjoining compartment, Mr. Reid has represented Design, Textiles, Metal, and Ornament, by four figures, draped in light reds, yellows, and greens, with a light mauve sky.

On the south-west angle, Mr. Garo Melchers, who has also studied at Paris, has taken up the "Arts of Peace" and the "Arts of War" in his two spandrels, the subject being treated with good flat washes, the skins of the warriors being of a swarthy hue, the colour of the armour being perhaps slightly overdone, but the execution being very good; perhaps too many figures are in the "Arts of Peace," which has the appearance of being somewhat overcrowded.

On the western side, the northern of the two domes is executed by Mr. E. H. Blashfield, who has taken as his subjects the arts of the Ironworker, the Goldsmith, the Brassworker, and the Armourer; Mr. Blashfield has done more decorative work in the States than any one, as mentioned above, and his reputation certainly will not suffer from what he has done here, which is thoroughly decorative, in a light flat key, while above, on a blue spotted sky, birds are introduced. We have gone somewhat fully into this building, because so many artists have been employed on it, and partly because it seemed to give such a scope for subjects which decorative art could so well interpret.

On the Agricultural Building on the opposite side of the grand basin, Mr. G. W. Maynard has treated the whole of the figures himself, the framework being painted by another hand. In the Manufactures Building the scheme was more or less Renaissance in character, while here Mr. Maynard has gone in for something which is essentially Pompeian in feeling. The paintings occur at the central entrances and at the angle pavilions on the walls under the colonnades. The wall to the main entrance on the north is treated with plain Pompeian red with Greek key pattern in a subdued yellow. On the right is Ceres on terra-cotta ground in a golden chariot drawn by young lions, treated in flat tints; while on the left is King Triptolemus in his chariot given by Ceres in

order to go forth to teach the nations of the world the art of agriculture. Between these, on each side of the entrance, are figures representing "Abundance" and "Fertility" in deep red on a light orange ground. The corner entrances are decorated with figures on either sides symbolical of the seasons, and above are friezes in which oxen, horses, &c., occur. All the subjects, it will be seen, are treated from the point of view of their relation to agriculture, and the whole presents a completely thought-out scheme in which the colouring, although harmonious, is perhaps somewhat too bright; but accentuated at so few points on the structure, it certainly errs on the right side.

It will be remembered that the Machinery Hall, besides having an ambulatory on the ground story, also has a loggia to the upper story with a colonnade of Corinthian columns in front. The wall of this loggia has been decorated by Messrs. Maitland, Armstrong, & Co. in pale yellow, and mouldings picked out in gold. Although the general effect of the long vista looks well, it hardly amounts to a colour scheme, so sparingly has it been introduced; the same may also be said as to the Electricity Building, although the semi-circular entrance in the centre of the south front and abutting on the court, which is executed by Mr. Garnsey in a light decorative key, the figures being put in by G. W. Maynard, has a character suitable to the subject.

Mr. Millet, the Director of Colour, took the dome of the Fine Arts Building in hand; in the pendentives he placed four figures illustrative of Architecture, Painting, Sculpture, and Engraving; the drapery being in white, with a pale violet tint running through it. The coffer in the upper part are kept very quiet.

The colour decoration of the Horticultural Buildings consists merely of a frieze round the inside of the dome, consisting of festoons and wreaths of the passion vine; in the wreaths are inscribed the names of men famous in horticulture and kindred sciences, treated in bright and gay colours, and quite suitable for the purpose, although of course not coming in the higher domain of decorative art. Mention must be made of the New York State Building, by Messrs. Mackim, Mead, and White. The design is founded on that of the Villa Medici, at Rome. The colour work in the grand staircase hall was undertaken by Mr. C. C. Colman. It is a space 46 ft. by 37 ft. The main scheme is Pompeian, the background being a very strong red, such as is seen in some German restorations, and which quite kills everything in the way of architectural features which are in the vicinity. The figure-subjects which occur are in small geometrical panels, and are very well put in and show careful drawing and knowledge of the style, and it seems a pity that the general effect has been so spoiled by such a loud background.

The great Hall on the first floor is luxuriously finished in "staff," in the Louis Seize style, the colouring being of cream and gold. In the centre of the ceiling in a deeply-moulded panel is an allegorical subject, by Mr. F. D. Millet, treated in somewhat faded colours, and going well with the light key of the general scheme.

The Transportation Building, by Messrs. Adler & Sullivan, which we have reserved for the last, is by far the most important piece of colour decoration at the Exhibition. The building has been described, and it has been shown how, from the very first, the building was designed for a great colour scheme. Mr. Sullivan has some original ideas on the question of colour, one of these being that on the principle that you cannot have too much of a good thing, that, therefore, you cannot have too much colour.

It has been shown that beyond the great projecting cornice and the Golden Gateway there are no architectural "features" of any kind, the walls being just left with the plain plaster surface.

No less than forty tints of colours have been used in the façade, which consists of a series of semi-circular arches, the lower portion occupied by two columns, with Byzantine-like foliage, supporting a beam treated in colour with flat surface. The general scheme of the façade is a series of geometrical figures, simple in the first instance, such as circles, in which other figures are interwoven of different colours so that the original figure is almost lost, the whole producing an effect akin to embroidery. The main arches are enclosed by a band of dark red, which is the strongest colour in the scheme, and the smaller figures are worked down from this colour, which serves as a base. Above the piers of every other opening is a large figure, 14 ft. high, of a woman holding a screen in front between her hands, with the name of some famous inventor in regard to Transportation. The idea of Mr. Sullivan in these stiff and almost archaic figures was to get the idea of motion expressed without movement of the body, and for this reason the figures, which are all similar, have large outspread wings of white colour, which detaches them somewhat from the main colour scheme. The figures are painted on canvas, and afterwards applied to the façade. Mr. Sullivan, it may be mentioned, is an enthusiastic botanist, and all his system of sculptured and coloured work is derived from a study of practical botany.

The main entrance, 100 ft. wide by 70 ft. high, which is known as the Golden Gateway, and which faces the lagoon, consists of a series of semi-circular arches in receding planes, enriched with carvings and bas-reliefs and sculptured forms. These arches come down on to an angular plinth. The whole gateway is treated with aluminium, covered with yellow lacquer. This was done because it was cheaper than gold-leaf, and the action of the weather has produced a rich, varied tone, which is certainly very effective. The parts below the surface are picked out in subdued blues and reds to accentuate the various geometrical forms.

As a purely colour scheme, thought out and designed from its very commencement for polychromatic decoration, this building is as important, and perhaps more so, as any erected in recent years. Of course such a scheme of colour was impossible in the main court, where the architects wisely determined to leave the surfaces plain white, from motives of symmetry and general effect, but, as the Transportation building is placed away from the main court, and in front of the picturesque wooded island, it could not interfere with the surrounding architecture, and praise is due to Messrs. Adler & Sullivan for the thoroughness with which they have treated the building as a colour problem. It must have required a considerable amount of boldness even for an American architect to have thrown aside the usual architectural forms and accepted methods, and to have designed a building from the very commencement with reference to the application of colour, and not, as is usual in such cases, to apply it as an afterthought. It may be interesting, as showing that the executive spared no money in the realisation of the scheme, that the contract price for the colour work alone was 5,000*l.* sterling, and its real cost must have exceeded that sum.

From what we have said it will be seen that colour decoration has received more attention from architects and decorators at the Columbian Exhibition than any previous one, and, as we have before mentioned, here we have the actual work executed and occupying the place it was designed for, and where it can fairly be judged on its merits, which it is impossible to do with isolated schemes shown in a picture gallery. That an American school of colour decoration will naturally grow out of this seems but the natural result, especially in a country possessing rich citizens, who are not unwilling to expend large sums in the adornment of their houses, their churches, and their public buildings.

NOTES.

HERE seems to be a somewhat widespread desire, both on the part of coal owners and miners, for the resumption of work at the coal mines; and, as some of the former are said to be prepared to re-open their pits at the old rate of wages, it is very improbable that the struggle will last much longer. The Welsh miners appear to have repented already of their outbreak, and will, doubtless, soon resume the employment so hastily and unadvisedly thrown up. The chief event of the week has been the conference of miners in London, the result of which had not transpired at the time of writing. The main point for consideration is, whether those who are willing to work, and who are offered their old places at their old rate of wages, can, in the interests of the Miners' Federation, be allowed to resume. There are arguments both for and against such a course being pursued before the general questions at issue are settled, and the fact that opinion is very much divided, points to an early termination of the struggle. Outside pressure from consumers, and the diversion of orders to pits which have not closed, will naturally go far towards inducing the coal owners to re-open as early as practicable; even though—as in the cases alluded to—it would involve abandoning their original position.

WE have been invited to view the exhibition, which is now being held at the Art Union, of the works of art selected by the prizeholders for the year 1893. The pictures, in most cases, represent the selection of the prizeholders themselves from a recognised exhibition such as the Royal Academy, the Royal Society of British Artists, the Royal Water Colour Society, the Royal Institute of Painters in Water Colours, Nineteenth Century Art Society, the New Gallery, the Royal Hibernian Academy, and the Society of Lady Artists. It may be well to remind readers that "the Art Union was established to promote the knowledge and love of the fine arts and their general advancement in the British Empire by a wide diffusion of the works of native artists, and to elevate art and to encourage its professors by creating an increased demand for their works and an improved taste on the part of the public. It is under the direction of a Council of the members, whose services are honorary." Having inspected the exhibits, in the majority of which we are disappointed, the question may well be asked whether the advancement of knowledge and love of art, as followed in the Art Union, is really under the direction of the Council? Is it not rather under the direction of the prizeholders, who, with or without any knowledge of art, as the case may be, are turned loose into a recognised exhibition by a Council who, we infer, are confident that, in buying from these exhibitions, the prizeholders cannot help obtaining a work which will advance their knowledge and love of art? The best work in the exhibition is undoubtedly landscape, and many, if not most, have been seen before this year in the exhibitions. "The Blackwater from Danbury, Essex," by Thomas Payne, is a pleasant landscape, with sunny foreground. A "Big Drink," by J. T. Nettleship, from the Academy, occupies considerable space; we should, however, prefer the charms of this picture in a gallery than in a private house. We next come to "Miller's Dale, Derbyshire," by T. Williamson, and "Christchurch, Morning," by D. Longdon, both good landscapes, and likely to give pleasure to their possessors, though the clouds of the latter lack character and drawing, and the position of the figure in the foreground is capable of alteration. "Summer Time, Riverdale, Dorset," is a capable piece of colour by Chas. Collins, and has near it "Fish Girls Waiting for the Boats," by H. Caffieri, "Gossiping," by Geo. Marks, and "Rye, from Winchelsea

Marshes," by W. H. J. Boot. All are pleasing landscapes, but the figures in the last-named are hurriedly and badly put in, and spoil the foreground. "Across the Marsh to Rye," by W. T. Bishop, is the only other landscape that we recollect with much pleasure. Lord Westbury has lent his picture, "The Silver Dart," by John Clayton Adams. (An etching of this is to be supplied to the members of the Union.) It is a charming piece of colour, and the most interesting of the exhibits.

HABITUÉS of the famous sale rooms of Messrs. Christie, Manson, & Woods when they resort to them next season will find a considerable change in their outward appearance. The common-place front and the insignificant entrance, which were a good fit after all to the wonderful works of art to be found within, are in process of disappearance, to be followed in due course by a more striking frontage. It will not be without regret that many will view the change, for something unique in its way, and rather characteristic of our English ways, will have disappeared when the dingy old front of this celebrated mart is replaced by a more modern and more pretentious building. That the firm itself would have been glad to have retained the old and well-known appearance of the outside of these rooms is, we understand, not in doubt, but the inexorable decree of the landlord, in this case the Crown, left no choice but to replace the old front by one more in keeping with the new style of buildings in the West-end of London.

THE decision of the Court of Appeal in the case of *Lister v. Lane*, which is reported in the current number of the Law Reports, cannot be considered as stating any new principle of law. But it emphasises one which has been frequently acted on, and applies it to a particular set of circumstances. The plaintiff claimed against the defendant damages for breach of a covenant "to repair, uphold, support, sustain, and maintain" certain premises. The building was a riverside house at Lambeth, a wall of which bulged out; it was an old house which had existed for over a century, and the foundations of which were piles in the mud. It was proved by the evidence that in order to place the house in good and safe condition a new concrete foundation must have been built. The Court of Appeal held that under these circumstances the tenant was not liable, because a covenant to repair and maintain a house must be construed with regard to the age and general condition of the house at the commencement of the tenancy. As Lord Justice Kay truly remarked, "the house was built upon a timber structure laid on mud, the solid gravel being seventeen feet below the timber structure, and the only way in which it could be repaired was by underpinning the house. Would that be repairing, or upholding, or maintaining the house? It would not, it would be making an entirely new and different house." No doubt it would be very agreeable to a landlord to have a new concrete foundation instead of a rotten wooden structure, but the aim of the law is not to give a landlord new material in place of old, but to oblige a tenant to keep old material in as reasonably good condition as is possible under the circumstances.

AMONGST recent additions to the Guildhall Art Gallery are two pictures, the gift of Sir Reginald Hanson, of Old Westminster Bridge, 1747, from the river, by Samuel Scott. In one of these views Scott shows a long gable roof next west of and in line with that of Westminster Hall, and the tower of St. Margaret's Church, as surmounted by a leaden truncated pyramid instead of the stone cupola delineated in his similar painting in the

National Gallery (bought out of the Wheeler fund, and formerly in Lord Lonsdale's collection sold by auction in 1887), and the latter cupola does not correspond with the smaller cupola, or rather lantern, which the tower carries at this day. One of the two pictures—it has been engraved by P. C. Canot—is labelled as "looking down the river"—apparently by mistake, for (as in the other) the church tower and Cardinal Morton's Gatehouse, Lambeth, are shown in the background, to the left hand. We notice also Abraham Pether's view, from Chelsea [Battersea] Bridge, of the burning of Drury-lane Theatre, on the night of February 24, 1809; the picture was presented by Colonel Rutley; Mr. Philip Norman's painting of the Holborn front of Staple Inn, done before the recent restoration by Mr. Alfred Waterhouse, architect, wherein the seventh gable (westwards) does not appear (see "Notes" in the *Builder* of November 13, 1886, and November 12, 1887); and Mr. E. A. Heffer's drawings of portions of the choir, Westminster Abbey, showing Henry V.'s tomb and chantry, and monuments of Henry III., Edward I., and Eleanor of Castile, and, in St. John the Baptist's chapel, that of Thomas Ruthell, Bishop of Durham, secretary to the Kings Henry VII. and VIII., who by mistake sent to his later master an inventory of his own private possessions instead of a State paper. The chapel is now entered by the beautiful little doorway of St. Erasmus's Chapel.

THE Public Gardens Association have offered to lay out, subject to its maintenance by the Islington Vestry, the newly-turfed plot of ground which was lately obtained by covering over a further portion of the New River. The length lies along Canonbury-villas and Astey's-row, between Canonbury-grove and the "Old Thatched House" tavern, which claims to have been established in 1400, where the river passes beneath Essex-road, and so to re-appear, but now no longer open to the sky, at the north end of Colebrooke-row. Thus the parishioners will be recompensed, in a measure, for their loss of the once pleasant spaces in and about Canonbury-fields. The Association have also arranged with Lord Calthorpe for the preservation as an open space of the area in front of Duncan-terrace, at the southern end of Colebrooke-row, which he had proposed to sell as a building site; whilst the Vestry have relinquished their opposition to a similar sale of the three-sided area at the junction of the Goswell and City roads, formerly known as Jack Plachett's-field. At Paddington Mr. Joseph Guedalla's committee have finished their labours, extending over three years, and resulting, we read, in the collection from public and private sources of 57,322l. So in the course of next month a public recreation-ground of about twenty-three acres will be handed over to Paddington Vestry, in trust for the public. A notable feature here is the children's outdoor gymnasium, which is greatly enjoyed; and an Act of Parliament, obtained *ad hoc*, enables the trustees to encourage the use of the ground for games and exercises. We learn, too, that efforts are being made to secure, with the co-operation of the Hampstead local authority, the yet remaining nine acres of St. Mary's-fields, by Kilburn.

WE have received Dr. Horne's report to the Local Government Board on diphtheria at Derry Hill, in the Calne and Chippenham Rural Sanitary Districts, in which, however, there seems to be no direct connexion established between the illness and any special insanitary condition of the habitations; at least the report sums up somewhat to that effect. It is stated that the Marquis of Lansdowne, who is lord of the manor and a principal landowner, has for some time steadily pursued a policy of replacing dilapidated dwellings by more modern constructions as opportunities have

offered, and that, generally speaking, the interiors of the cottages exhibit a commendable clean and tidy appearance. In our opinion, the details set down in the report as to drainage and water supply ought to be quite sufficient to render the neighbourhood a too favourable camping ground for diphtheria. We read that—

"Privies, with pits of various dimensions sunk below the surface, abound. They are frequently placed in outhouses, such as sheds used also as stables or stores, or are situated in gardens. Many are in bad repair. One, a tumble-down affair, consisted of a few uneven timbers stood on end, the dilapidated thatched roof, and a foul pit. The ash-pits vary in size, but are simply holes dug in the ground, into which house refuse is cast, and wherein, as I have said, bedroom slops are often emptied. Two or three were veritable 'sumpt' holes, with dirty water standing around the sodden contents. . . . Water-supply is obtained from wells averaging, perhaps, 20 ft. in depth. They are usually lined with loose stonework, uncemented, down to the water level, and are not seldom in proximity to dwelling, privy, or ashpit. Thus, in the instance of a couple of semi-detached cottages, in which there have been four fatal cases of diphtheria during the last eight years, and in which the stone floors are some 3 ft. below the level of the garden behind, the well, though about 5 yards from and on a higher level than the dwellings, is situated only some 8 yards below a privy which accommodates twelve persons, while immediately to the rear of this privy there are two pigsties and two ashpits. The privy vault is emptied once or twice a year, and I was told the contents are then found nearly dry."

Surely it is not surprising, after this, to read that "diphtheria appears to have been prevalent, more or less, in and about Derry Hill for some years."

DR. R. BRUCE LOW'S Report to the Local Government Board on an outbreak of enteric fever in certain villages situated on the river Rye in North Yorkshire, is of some special importance, as showing the evil effects of water-drinking from an open river. It appears that there are a few wells, of very bad construction and in very unhealthy surroundings, but disease has not been directly traced to these; while it was ascertained that in every household invaded by fever the water used for domestic purposes was taken from the river Rye. It is therefore of importance to note through what surroundings the Rye passes. We extract the following from the further portion of the report:—

"The feeders of the Rye rise in the Cleveland Hills, and the river proper is formed by the junction of two main streams, about five miles above Helmsley. The Rye thus formed flows in a deep, well-wooded valley, part of its course being through the extensive parks of the Earl of Feversham. From these it emerges at Helmsley, where the river receives a tributary called the 'Boro' Beck.' The Rye then flows along the south side of the Vale of Pickering to Nunnington, having for about five or six miles elevated ground rising almost immediately from its south bank. Further on, the Rye passes through flat country, and finally empties itself into the River Derwent, about four miles from the town of Malton. During the course of the Rye from its source till it reaches Nunnington, it receives the drainage from a number of hamlets and scattered farm-houses along its banks, as well as from certain villages, such as Fangdale-beck, Hawaby, and Rievaulx. Lastly, it receives the sewage of the town of Helmsley, as well as the drainage of cultivated land through which it flows below Helmsley."

Specific contamination of the Rye above Nunnington by excreta from enteric fever cases may have arisen through pollution of the river derived from several separate sources; and three such sources deserve special consideration:—

1. From the sewage of Helmsley, which is discharged into the river in a crude state five miles or so above Nunnington.
 2. From "town manure" and night-soil from Leeds, spread upon fields near the river between Helmsley and Nunnington.
 3. From privy "muck" spread by the Nunnington people, upon fields, gardens, and allotments on either side of the Rye, above the point at which they draw their drinking water.
1. The town of Helmsley . . . stands at the point where the Boro' Beck joins the Rye. . . . The town in two-thirds of its extent is sewered to two outfalls: one direct into the Boro' Beck, and the other into a tank on the banks of the Rye below the town, the overflow from this tank passing direct into the river. The remaining third part of Helmsley, which is unserved, comprises the High-street, with Church-street and Castlegate; practically one wide, straight street, down the middle of

which flows the Boro' Beck. At the top of the High-street stands the workhouse. The Boro' Beck at three different parts of its course down the street, is covered over, viz. (1) just opposite and below the workhouse for a distance of 80 yards; (2) just above and opposite the church, for a distance of 140 yards; (3) at the bottom of the street to the junction of the Beck with the Rye, a distance of 120 yards. Into these archways or tunnels, the drains of houses in the High-street discharge. At the workhouse there are five water-closets, which discharge into the first tunnel; into the second tunnel several water-closets, one of them from a hotel, discharge; and into the third tunnel several other closets, as well as one outfall from sewers in other parts of the town, discharge. The pipes conveying sewage into these dark archways do not usually reach the water in the stream, but discharge, in many cases, on the sides of the archways. The bed of the Beck is irregular, covered with stones, and the water channel is liable to be changed by floods. These tunnels are high enough to allow boys to walk through them; and they are used by idle and mischievous persons, for disposing of broken crockery, discarded pots and pans, broken baskets, disused dishcloths, worn-out matting, and other rubbish. To these in times of drought the filth and garbage cling. . . . Four schoolboys living in different parts of the town, in a spirit of bravado, dared each other to explore the dark recesses of the first archway of the Boro' Beck. All four boys did penetrate its filthy recesses, and in about a fortnight or three weeks all four boys developed enteric fever."

This is certainly a very instructive commentary on the views of those who would support the system of water-pumping from open rivers as a natural and economical source of water-supply.

WE learn that Dr. Povah, rector of St. Olave's, Hart-street, is engaged upon a history of his town and All Hallows, Staining, churches. The former, once called St. Olave's-by-the-Tower, was built circa 1410, and escaped from the Great Fire. It is often mentioned by Pepys, who used to attend service there when living in Seething-lane—whither he removed, into the Navy Office, from Axe-yard, Westminster, in July, 1660—and in Hart-street. Here he, his brother, and wife were buried. On March 18, 1884, the late J. Russell Lowell, being then American Minister, unveiled a memorial to Pepys, placed against the south wall, near the old doorway between an outer staircase and the Navy Office gallery pew. The memorial consists of a bust and alabaster tablet executed by Messrs. Earp, Son, & Hobbs, of Lambeth, and designed by Sir Arthur Blomfield, architect. The staircase is drawn in West and Toms's view of 1736. The battlements shown in their view were replaced with a plain parapet during some repairs made in 1822-3 by J. B. Gardiner, architect, who rebuilt the east (pointed) window of Bath stone and removed the Doric front (1674) of the north door. In 1632-3 the nave roof had been rebuilt of new timber and new leaded. Sir Arthur Blomfield made some interior alterations in 1871; the extensive repairs of 1892 were carried out under Mr. Ewan Christian's superintendence. Sir George Gilbert Scott designed the reredos, a gift, we believe, from the present rector, and the Caen-stone font. The organ, by Green (1781), was much improved in 1860, and again, by Walker, in 1871. The pulpit, from St. Benet Gracechurch, is the reputed work of Gibbons. Stow records twenty-six monuments and inscriptions in this interesting church; we may also cite those of Pepys's wife, Elizabeth (1669); Sir Andrew Riccard. ob. 1672, who gave the advowson in trust to the parish, and to whom the Turkey Company set up a statue; Sir John Radcliffe (1568), son of Robert, Earl of Sussex, and his wife Anne; Robert and Richard Cely, early benefactors; Sir John Mennes (1670), Comptroller of the Navy, joint author of "Musarum Deliciae"; Dean Turner of Wells (1568) and his son, Dr. Peter Turner (1614). Maitland mentions a brass of one John (? Arundell), Clarencieux, dated 1427. In his "Churches of London," the late George Godwin writes:—

"There are vaults beneath the church, and we were informed by the present intelligent Clerk of the parish, Mr. Samuel Smith, that the foundation-

walls are of rubble work, consisting of pieces of unwhewn stone and chalk, cemented together with mortar."

In 1870 they pulled down All Hallows, Staining, in Mark-lane, excepting the tower,* and the parish was united to St. Olave's. West and Toms published an engraving of the church, which Stow tells us was so called "for a difference from other churches of that name in this city, which of old time were built of timber, and since were built of stone." The churchwardens' books, which began with the year 1492 (some extracts from them are published in Vol. III. of the *British Magazine*) record John Mun's gift of 100l. for enlarging this church (1615). Having enlarged the Fire, nearly all but the tower suddenly fell down in 1671; the body of the church was rebuilt in 1674-5, after a plain design. The story goes that the Princess Elizabeth stopped to worship here on her way to Woodstock, after her release from the Tower on May 19, 1554, and then went to dine at the "King's Head," in Fenchurch-street.

THE current number of our American contemporary *Stone* contains an interesting article on the "Bluestone quarries of New York and Pennsylvania." We may remark that bluestone is the name given to one of the varieties of sandstone, which consists of exceedingly small particles of silica cemented together by silica; a small proportion of argillaceous matter is usually present. The stone is extremely hard and durable, but is difficult to work. Our contemporary states that the quarrying of bluestone probably requires as much skill, if not more, than any other kind of rock. The peculiar formation of the material, and the fact of its usually occurring in comparatively small deposits, make the use of machinery impracticable, so that at least 90 per cent. is quarried by hand-wedges and sledge-hammers. Quarries within four or five hundred yards of each other frequently differ greatly as to quality and size of blocks obtainable. The beds are usually thin on the top, and thicker as the deposit is worked into. The stone is well adapted for street paving, flagging, and curbing, and we learn from the *Mineral Statistics of the United States*, that the three States which produce it—New Jersey, New York, and Pennsylvania—annually furnish about five millions of cubic feet, valued at a million and a half dollars. We have no stone in Great Britain precisely similar in character to this.

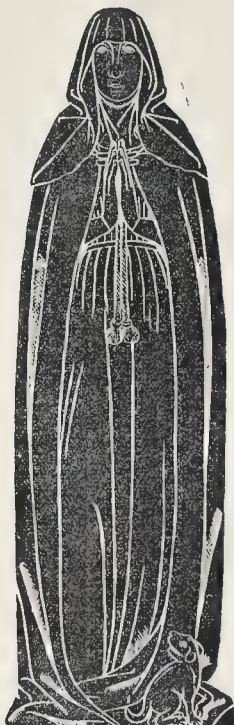
MANY of our readers will regret to see the record in our obituary column of this week of the sudden and unexpected death of Mr. Louis J. Dessurme, who has been for a good many years the sub-editor of this journal, and its representative as reporter at many meetings of architects, archaeologists, and sanitary engineers. Mr. Dessurme, who has been for eighteen years connected with this journal, was in the first instance engaged merely as a reporter, but his varied abilities and considerable practical knowledge of many technical matters connected with building soon led to his occupying a more responsible post on our staff, though to the last he acted as principal reporter at certain of the more important meetings of architects and others,—the meetings of the Institute of Architects, the Architectural Association, and those of the Association of Municipal and Sanitary Engineers. As a reporter Mr. Dessurme possessed that rare and invaluable quality, a kind of instinct in laying hold of the essential points in the argument of a speech or lecture, and passing over the non-essentials, even when in cases where the subject itself was strange to him; and in this respect we believe it may be said that he was one of the ablest reporters of lectures on technical subjects to be found in London; while he was one of the most careful and painstaking of sub-editors in securing accuracy in the ultimate form of printed matter.

* A model of the tower was made by Mr. Birch for his "Old London," Health Exhibition, 1884.



Et talem videtur fuisse Willham dñs de Exeteburgh armiger et Willaherth
 pater eius fuisse Thomam Willaherth armiger qui quidem Willams obtinuit apud
 Westmynster primo die mensis Decembris anno millesimo CCC^{to} 1^{to} quarto et
 proximo Willaherth die mensis Anno dñi millesimo CCC^{to}

William Fitzwilliam, Esq., and Elizabeth, his wife.
Sprotboro, Yorkshire, 1474.



Hic iacet dominus Thomas filius domini quondam Rectoris
 istius ecclesie qui obiit in die gratie apud nos anno
 domini millesimo ccccmo xxiij die martii mensis aprilis
 et requiescat in pace. Requiescat in pace. Amen.



*Thomas Aileward, Rector, 1413.
Havant, Hampshire.*

From rubbings made by F. R. Fairbank, M.D., F.S.A., 1892.

Apart from sub-editing work, Mr. Dessurme's special *forte* was sanitary appliances, of which he had a very extensive knowledge, and a very notable memory for what had been done in the way of successive inventions in the past history of sanitation. We think these few words of acknowledgment are only what is due from us to the memory of a man of whom it may be said that he did his work well and conscientiously—which is one of the best things any of us can desire to have said of us after we are gone.

tracery in the windows. The upper part—belfry—appears to be of the date of this testator.

F. R. F.

THE BRASS OF THOS. AILEWARD,
RECTOR, HAVANT, HAMPSHIRE.

THIS fine brass of a priest in processional vestments lies in the choir of Havant Church, with the feet to the west. Its position was doubtless originally in the choir, with, probably, the feet towards the east. When Haines wrote, it was placed against the wall in the north transept.

F. R. F.

F. R. F.

THE ARCHITECTURAL ASSOCIATION:
TWENTY-FOURTH ANNUAL EXCURSION.*

Wednesday, August 16.

On this day the visitors commenced their work on the Suffolk side of the Waveney, taking the train to Ipswich, where they were met by carriages. Driving through the town, a halt was made at the famous house in the Butter Market, erected by Robert Sparrowe in 1567, and illustrated in the *Builder* last week. Tradition says that Charles II., after his retreat from the battle of Worcester, was for some time concealed in this house, and the descendants of Robert Sparrowe long possessed a miniature portrait of the King, said to have been given to his host on quitting his hospitable asylum, but this presumptive evidence notwithstanding, it is very doubtful whether

* Concluded from p. 138, *ante*.

BRASS OF WILLIAM FITZWILLIAM,
ESQ., AND ELIZABETH HIS WIFE,
SPROTBORO', YORKSHIRE.

This brass, which is probably of local origin, lies in the chancel of the church of Sprotbro', which is the burial-place at one time of the Fitzwilliam family. The will of Mr. Fitzwilliam here commemorated is preserved at York. In it he expresses a wish "to be buried in the choir of the church of Sprotburgh," so that no impediment may be occasioned in going and returning to those ministering about the Divine services in the choir aforesaid. This would imply that already inconvenience was felt to be occasioned by the more pretentious altar-tomb, and points to the convenience of memorials such as these. The testator bequeaths 40s. to the belfry to be made *de novo*. The lower part of the tower is of Decorated date, with curvilinear

Charles was in the county of Suffolk at all after the decisive battle of Worcester. Sparrow's house remains, however, the finest example of ancient domestic architecture in Ipswich, not only by reason of its well-known façades to the street, but for its internal finishings in woodwork and plaster, its charming little internal court and its private chapel in the roof.

A long drive in the broiling sun brought the party to Heimingham Hall, one of the seats of the ancient family of Tollmaches, whose representative, Tolmach, was a great man before the Conquest. By the kindness of Lord Tollmach, the members were shown through the ground floor of the house, and were able to admire the furniture and fittings, pictures and prints, but sketching being forbidden inside, their attention was soon diverted to the exterior, which, although it is somewhat overlaid with comparatively modern work, is highly picturesque in its red brick and stone and tile, weathered and relieved by the moat which surrounds the whole. Being a large house, the buildings extend nearly to the moat, a narrow walk all round being left between the water and the walls of the house, which thus occupies with its large internal courtyard, practically the whole of the space enclosed by the moat, just as at Oxburgh Hall, visited on the King's Lynn excursion. Smaller houses seen on this excursion have, in this part of the country, their moats also, but the moat encloses far more than merely the house.

The church at Helmingham is a very pleasing example of the usual type, with a curious dormer window on the south side inserted to give room for a lofty monument, the aspirations of whose

designer declined to be limited by considerations of space.

From Helmingham a short drive brought the excursionists to Framden, which, at first sight, looked like a disappointment, as the exterior of the hall gives no sign of being other than an emaculated small manor house. By climbing to the attics, however, the remains are seen of a remarkably fine open timber roof of fifteenth century date, which must have originally spanned the hall. The most interesting point of the design of this roof is that alternate trusses have moulded posts running down to the ground floor, thus at once reducing the span and providing a very picturesque treatment.

The barn at Framden is of ancient date and has a very good roof, though, of course, not adorned, like that of the hall, with moulding and carving.

From Framden the party drove back to Ipswich, and returned to their headquarters by train.

Thursday.

Again crossing the Waveney into Suffolk, a half-hour's drive took the members to Brome Church, which, although containing work of every period from Norman to Renaissance, has, in the course of a very thorough restoration, been scraped of its interest. The west tower, with its circular base and octagon belfry, is one more example of a type not uncommon in the district.

From the church to the hall is but a short distance, and here the visitors were kindly received by Lord and Lady Bateman, and enjoyed to the full their two hours' stay. The house was considerably damaged by fire at the beginning of the century, and the subsequent reparations have doubtless to some extent modified its form, but hardly to the extent that might seem to be indicated by an old engraving shown to the visitors, which, signed "L. Knyff, del." and "I. Kip, scul." purports to represent Brome Hall, the residence of the Right Honourable Charles, Lord Cornwallis, Baron of Eye, and Lord Lieutenant of the county of Suffolk. It seems doubtful whether this is more than a design, as both the house and the gardens are shown essentially different, as well as far more grandiose than anything that remains. The gardens, as they exist, are as good an example as could well be found of the "formal garden" of the eighteenth century, with clipped box and yew, straight and geometrical borders and alleys, which, seen on a bright sunny morning, took by storm the hearts of the visitors, and converted any waverers on the subject to allegiance to the so-called formal garden, one of whose greatest charms, as seen at Brome and elsewhere, is that, however formal the disposition of the main lines may be, the flowers are arranged in studied absence of formality and regularity. The sundial, by Henry Wynne, of London, attracted considerable attention from its highly elaborated astronomical information, the comprehension of which baffled the powers of the visitors as of their hosts. The house, as it stands towards the gardens, with a great octagon on the west side, its two stone bays on the south, its crows steps and cut brick chimneys, seems to fit the garden as this does to fit the house, and produces a most charming and delightful home, from which all were loth to part.

On an A.A. excursion, time and the quarter-master are inexorable, and so progress was made for Wingfield, passing on the way, near Hoxne, the spot where tradition says that St. Edmund, king and martyr, was beheaded, as well as the bridge which he is said to have made his last hiding-place after the Castles at Dunwich and Framlingham had failed him, as a protection against the Danes. The somewhat flippant remark has been made that had the Saint's Christianity been of a more muscular character he might have been more of a king and less of a martyr.

Wingfield Castle was built by Michael de la Pole, first Earl of Suffolk, in the reign of Richard II., but of his work, the south front and moat are practically all that remain. The west side, now converted into a farm-house, is of sufficiently early date to be picturesque, though there is little detail left. As a piece of colour, Wingfield Castle is about the most charming tit-bit seen during the week, which for the water-colour sketchers of the party was one continuous revel. Two hours, therefore, seemed all too short, when two days or two weeks could have been filled by the painters. The west side attracted the most part of the sketchers, but east, north, and south all had good subjects, whilst several artists favoured the internal courtyard, for Wingfield was of sufficient size to possess this feature already remarked at Helmingham.

The church of St. Andrew was visited by some of the members and is highly interesting, being a collegiate church, the house for a provost and nine priests, having been founded by Sir John Wingfield in 1362. The choir stalls still remain, with their original plan maintained. The vestry or sacristy has a room over, with two hagiocopes through the wall, and another commanded the altar from the sacristy. It is evident, therefore, that the property of the church was of some value. The vestry has a piscina of ancient date in its original position. The roof-screen has completely vanished, but it evidently extended right across nave and aisles, as the two stone staircases, one in the north aisle and one in the south, still remain, and a fragment of the roof beam has been left. The church appears to have been some time in reaching its present form after the foundation of the college in 1362, as much of the work, and notably the chancel, with its highly ornate arcade on the south side, is clearly of later date, and reaching well into the fifteenth century. A curious chest exists in the vestry or sacristy hewn out of a solid tree, like a "dug-out" canoe. There are some remarkably fine tombs and brasses of the Wingfields and de la Poles, including that of the founder, and there are also some interesting fragments of old glass.

Friday.

The first visit on this day being fixed for Framlingham, a long drive from Diss of some two-and-a-half hours was first necessary. In spite of the excessive heat—for this is said to have been the hottest day of the century—the drive was very enjoyable, and everyone was in good spirits. Framlingham is not only a picturesque town, with considerable architectural attractions, but possesses a certain amount of historical interest as the scene of the exploits of Boadicea, Queen of the Iceni. At what time the original castle was built is uncertain, but it is known that a fortress existed here in the time of Redwald, third King of the East Angles. The castle was also the retreat of King Edmund the Martyr, as already alluded to. In 1173 it became the temporary asylum of Prince Henry, whom Queen Eleanor, his mother, had incited to rebel against his father, Henry II. Upon the death of Edward VI., in 1553, Mary retired to this castle, where she was joined by the inhabitants of Suffolk and the neighbouring counties, who, to the number of 13,000, accompanied her to London to take possession of the crown. The outer walls of the castle, as well as the moat, are in a tolerably perfect state, but there is little detail of an architectural character remaining beyond some very good cut brick chimneys, and the gateway tower with the arms of the Howards, Mowbrays, and Brothertons in one shield, having lions for supporters, and for the crest a lion passant. The church is a large and stately edifice, principally of Perpendicular date, with a lofty square western tower, over the entrance to which is a representation of St. Michael encountering the dragon, sculptured in high relief. The nave has a very fine roof, with fan groining in oak to the lower portion, and collar beam above. There is also a fairly well preserved fresco of the Crucifixion on the wall over the north arcade, and a good brass pendant candelabrum. The chancel is, however, the finest part of the church, and is said to have been added in the reign of Edward VI.; but is now disused, the chancel arch and side arches to aisles being blocked up. An old organ front received much attention from the sketchers, as did also the remarkably fine tombs of early Renaissance date. The monuments of Henry Howard, Earl of Surrey; Henry Fitzroy, Duke of Richmond, natural son of Henry VIII.; the two wives of Thomas, Duke of Norfolk, who was beheaded in the reign of Elizabeth, and the wife of Sir Robert Hitchen are the principal examples. The almshouses of the town were visited, but did not call forth the sketch-books, as, in spite of their antiquity, they lack architectural interest.

After luncheon, on the return journey, a halt was made at the church of St. Mary, at Earls Soham, a comparatively small but interesting building. The nave is said to have been erected about 1470, and the chancel about 1320 A.D. The hammer-beam roof with its sculptured figures in niches to the wall-posts is the chief attraction, and other good woodwork of seventeenth-century date may be seen in the pulpit, with its tester head, and the west gallery. A piscina at the south end of the aisleless nave is a somewhat unusual feature. The south porch, with its figure of St. James, is picturesque, although not elaborate. Efforts were made by some of the party to decipher some inscriptions on the buttresses of the western

tower, which are believed to record the names of the designer and builder of the church, but their weather-worn state prevented their recognition in the short time at the disposal of the visitors.

Southolt, included in the programme, was omitted for want of time, and the next stoppage was made at Fleming's Hall, another example of the picturesque moated manor-houses in which the district is rich. The date on the sun-dial, which was made by one Henry Sutton in 1659, is probably very close to that of the house, which has picturesque curved gables and mullioned and transomed windows, all executed in moulded red brick and originally stuccoed to represent stone. In the interior of the house are some fragments in various rooms of oak panelling which bear evidence of greater importance than the house now possesses. Refreshed by the host with apples and cider, the visitors proceeded on their way in good spirits.

This completed the day's work according to the programme, but as the way homeward lay through Eye, a halt was made to enable the members to look at the magnificent church of St. Peter and St. Paul, the tower of which is one of the finest in the Eastern Counties. The screen, with its double planes of tracery, and its colour decoration, gesso work, and paintings attracted considerable attention. There is in the chancel a very ancient tomb, much defaced.

The remains of the castle were looked at only from a distance, as they are now of small importance, little being left of the work of Robert Malet, whose father accompanied William I. to England. Robert Malet also founded at Eye a Benedictine monastery dedicated to St. Peter, to which was annexed the ancient episcopal see at Dunwich, and in which was preserved St. Felix's book of the Gospels, written in large Lombardic characters, and called the Red Book, on which the people used to be sworn, and which was removed from the abbey at Dunwich when that place was destroyed by the sea.

Returning to Diss, the evening was celebrated by the final dinner and music, prior to the departure next morning of the members, Diss itself not containing more architectural attractions than its church, some of the features of interest in which we illustrated last week, and a few fragments of old timber houses.

On Saturday, some of the members, under the guidance of Mr. Searles-Wood, the honorary secretary of the Excursion, again visited Ipswich, where they inspected some of the old houses of the town, and then went to Christchurch, so named from the priory of Augustine canons, originally founded in 1177, and, being destroyed by fire, re-founded soon after by John, Bishop of Norwich, for a prior and six canons. Part of the grounds of the ancient monastery now form a public park.

PORTLAND CEMENT: THE VALUE OF FINE GRINDING.*

IN this short paper it is proposed to deal entirely with the above point in the use and manufacture of Portland Cement.

In June, 1890, the author had the honour of reading a paper before this Association at their District Meeting at Norwich, on "Portland Cement Specifications," in which paper the subject of grinding was touched upon as follows:—"The second clause generally found in the specification is with respect to the degree of fineness to which the cement is to be ground. This, of course, is a practical test, and one of great importance; the finer the cement is ground the greater its value for concrete work. I may mention that the average requirement is not more than 10 per cent. to 15 per cent. residue when sifted through a 50' sieve, that is, one having 2,500 holes to the square inch. Such residue, however, although the hardest and best part of the burnt 'clinker,' is of no more value in the cement than so much sand, but which, if ground, would greatly increase the strength and the commercial value of the cement."

Since that time a number of papers on Portland cement have been read and discussed before different Associations, in most of which the advantages of using finely-ground cement have been demonstrated, but as far as the author is

* Being a paper read by Mr. H. K. G. Bamber, F.C.S., at a recent meeting of the Association of Municipal and County Engineers, West Bromwich.

† "Proceedings of the Incorporated Association of Municipal and County Engineers," vol. xvii., page 156.

aware it has not yet been shown what is the actual gain in strength to be obtained by this finely-ground cement compared to the increased price per ton which is to be paid for the more finely-manufactured article. The author has often been met with the reply when discussing the subject with an engineer, "What is the use of having finely-ground cement if we have to pay so much more for it?" It is this point with which the author proposes to deal, and to endeavour to show from the results of experiments which he has made with cement ground to different degrees of fineness, what is the increased gain in strength, and what would be the cost to the manufacturer of reducing cement to this extra state of fineness, when engineers will be able to decide for themselves whether it is more economical to use a finely-ground cement or a comparatively coarse one.

For the experiments on this subject the author used a cement having the following composition:

Silica	24.600
Alumina and oxide of iron	10.761
Lime	61.664
Magnesia	1.010
Sulphuric acid	1.424
Carbonic acid	.210
Organic matter, &c., and loss	.331
	100.000

And having a specific gravity, fourteen days after being ground, of 3.181, and ground to leave a residue of 15 per cent. on a 2,500 mesh sieve, which is about the degree of fineness a buyer of cement generally obtains, unless he specifies a more finely-ground cement, and pays for it in proportion.

In order that the results of these experiments might be comparative, a sufficient quantity of this sample of cement was placed in an air-tight case, and small portions taken therefrom for the experiments as required, which extended over several days, so that the condition of the cement for the last series of experiments was practically the same as for the first, the cement having been kept free from exposure to the air.

Experiments were first made with this neat cement to show the tensile strain obtained at seven and fourteen days respectively after being gauged, the briquettes having been kept six and thirteen days respectively in water. The original cement was first taken, having a residue of 15 per cent. on a 2,500 mesh sieve, and the following experiments, with the same cement, with the residues on the different size sieves, as shown in the first column, ground to pass through the same:

Fineness of Cement.	Quantity of Water.			Tensile Strain at 7 days.	Tensile Strain at 14 days.
	Percent.	Lb.	Lb.		
15 per cent. residue on 2,500 (50 x 50 mesh)	18	440	530		
Leaving no residue on 2,500 (50 x 50 mesh)	18.5	467	561		
Leaving no residue on 4,900 (70 x 70 mesh)	19.5	480	580		
Leaving no residue on 8,100 (90 x 90 mesh)	20	500	595		
Leaving no residue on 12,100 (110 x 110 mesh)	21	510	620		

The results given are an average of six briquettes in each case, and the strain was applied at the rate of 100 lbs. every fifteen seconds, the increase of strength being gradual with each degree of fineness. It will be seen also that the quantity of water used for gauging, to obtain the same state of consistency before placing in the moulds, increased with each degree of fineness, showing that there was more cementitious material therein ready to take up its equivalent of water.

The increase in value of cement, however, due to fineness of grinding, is much more clearly shown by sand tests than by neat tests, each small particle of sand requiring to be covered over by a thin coating of cement, and it was evident that the more finely ground it was the greater would be the surface on the particles of sand which would be thus covered. It will be noticed, however, that in the cement used for these experiments, the residues on each sieve have been ground up to pass through the same and then added to the original, which had

already passed through, and it will be readily understood that if the residues on each particular sieve had been ground up, as would be the case in practical work, without separation from that part of the cement which was already fine enough to pass through, even that finer part would have been still further reduced, and a cement of much finer average would be produced than that with which these experiments were made, and should consequently show even better results than those given below with the residues ground separately, and afterwards added.

The sand used for these experiments was the standard sand obtained from Leighton Buzzard, of a size such that all should pass through a 20 x 20 mesh sieve, and be retained on a 30 x 30 mesh sieve. The results were obtained at twenty-eight days, the briquettes having been placed in water twenty-four hours after being gauged, and are the average of the six highest strains obtained in each case, the strain being applied, as before, at the rate of a 100 lbs. every fifteen seconds.

Fineness of Cement.	Partly Weight of Sand.	Partly Weight of Cement.	Quantity of Water.	Breaking Strain in lbs. per sq. in.	Average.	Increase of Strength.
15 per cent. residue on 2,500 (50 x 50 mesh)	3	1	10	145 160 148 160 160 150	154	Original.
Leaving no residue on 4,900 (70 x 70 mesh)	3	1	10	180 160 185 185 115 160	181	p.c. 20.7
Leaving 10 per cent. residue on 5,776 (70 x 76 mesh), and no residue on 50 x 50 mesh	3	1	10	195 210 255 210 200 200	212	37.66
Leaving no residue on 8,100 (90 x 90 mesh)	3	1	10	210 250 230 215 230	237	53.89
Leaving no residue on 12,100 (110 x 110 mesh)	3	1	10	290 295 300 295 285 298	294	90.90

From the results of these experiments it will be seen that the increase of strength, using the same cement simply ground to a finer state, is gradual with each degree of fineness, amounting, when the cement is ground fine enough to all pass through a sieve having 12,100 meshes to the square inch, to more than 90 per cent. of the original, and even this might be still further increased, as shown by Mr. A. E. Carey, M.Inst.C.E., in a paper read before the Institution of Civil Engineers in 1892,* where he has given the results of an experiment made with three parts sand and one part of cement, from which the residue on a sieve of 32,257 mesh had been removed, and with which he obtained a tensile strain of 360 lb. per square inch at twenty-eight days.

From actual trials which the author has made he has found that with suitable machinery for the purpose, the increased cost to the manufacturer of grinding a well-burnt cement to a state of fineness so that all should pass through a 50 x 50 mesh sieve, and leaving only 10 per cent. residue on a 76 x 76 mesh sieve, compared to what the author calls ordinary grinding—viz., 10 to 15 per cent. residue on 2,500, would be about 30 per cent., and to grind the cement so that all should pass through a sieve of 12,100 mesh would be about 100 per cent.; but it must be remembered that this increased cost of manufacture only applies to the expense of grinding the cement, and not to the whole value of the cement per ton, which in the first case would be met by an increase of price of about 2s. per ton, and in the latter of about 6s. per ton.

For this extra 2s. per ton the engineer would obtain a cement which, as shown by the above experiments, would be 37.66 per cent. stronger than a cement ground to leave from 10 to 15 per cent. on a 2,500-mesh sieve, or in the latter case for the extra 6s. per ton, or an increased price of about 22 per cent., he would obtain a cement which was almost twice as strong as that in ordinary use. It may be said, however, by engineers that they are quite satisfied with the present strength of the concrete they obtain, using this ordinarily ground cement, and that they do not think an increase of strength necessary even with the small augmentation of price which would have to be conceded. The point then arises, whether it would be more economical to use this finely-ground cement, and to reduce the quantity in the concrete, but still keeping sufficient to maintain the average strength of the concrete. The author is of opinion that this might be carried out with safety, but would not recommend the reduction of the quantity of cement in concrete which was to be exposed to the action of sea-water, however fine the cement might be ground, as the gain in strength and impermeability in such work would alone more than compensate for the increased outlay on the cement. With the object of finding out how far this reduction in the quantity of cement for ordinary concrete might be carried out, the author has made the following experiments with the same cement as previously, but in this case he gradually reduces the quantity of cement used in the concrete blocks until he reaches a point when only one-half the original quantity is taken.

Fineness of Cement.	Partly Weight of Sand.	Partly Weight of Cement.	Breaking Strain in lbs. per sq. in.	Average.	Increase of Strength over Original.
15 per cent. residue on 2,500 (50 x 50 mesh)	3	1	145 160 148 160 160 150	154	Original.
Leaving no residue on 4,900 (70 x 70 mesh)	3	1	200 295 300 205 285 258	294	p.c. 90.90
Leaving no residue on 12,100 (110 x 110 mesh)	3	0.330	260 265 246 210 250 248	251	p.c. 63.0
Leaving no residue on 12,100 (110 x 110 mesh)	3	0.750	180 195 190 195 195 195	192	p.c. 24.6
Leaving no residue on 12,100 (110 x 110 mesh)	3	0.620	160 180 175 180 178	175	p.c. 13.6
Leaving no residue on 12,100 (110 x 110 mesh)	3	0.500	160 170 172 167 165 162	166	p.c. 7.79

It will be seen by the results obtained, that by using cement which has been ground fine enough so that it shall all pass through a 12,100 mesh sieve, the increased strength of which, as shown by the previous set of experiments, over the original cement is more than 90 per cent., that the quantity of cement may be reduced even to the extent of one half, and even then the original strength of the concrete is more than maintained.

The author also made similar experiments with the same cement ground to leave only 10 per cent. on 5,766 mesh sieve, which is a degree of fineness now being frequently asked for by engineers, and it will be seen from the following results that even in this case the quantity of cement used in the concrete may be reduced as much as 25 per cent. without any reduction in the strength of the same.

* Minutes of Proceedings, Inst.C.E. vol. cvii., p. 47.

Fineness of Cement.	Part by Weight of Sand.	Part by Weight of Cement.	Breaks in Strain in lbs. per sq. inch.	Average.	Per cent. of Strength over Original.
15 per cent. residue on 2,500 (50 x 50 mesh)	3	1	154 160 148 160 160 150	154	Original.
Leaving 10 per cent. residue on 5,776 (76 x 76 mesh)	3	1	105 210 255 210 200 200	212	p.c. 37.60
Leaving 10 per cent. residue on 5,776 (76 x 76 mesh)	3	0.750	156 150 150 165 162 105	158	p.c. 1.3
Leaving 10 per cent. residue on 5,776 (76 x 76 mesh)	3	0.500	137 140 132 160 162 140	145	Less than Original.

The author is of opinion that the results of all these experiments clearly show that these coarse particles of unground cement clinker, which are retained even on a sieve of 12,100 mesh to the square inch, are of no cementitious value whatever, and, as previously stated, are of no more use in the cement than so much sand, and he has found by experiment by taking the original cement, separating the residue on a 12,100 mesh sieve, which amounted to 40 per cent., replacing this quantity by an equal amount of sand of the same size as the residue, that the tensile strength by this alteration has not been materially, if any, reduced.

The question also arises whether these coarse particles are not a source of danger to the concrete, especially when it is in contact with sea-water. It is generally admitted now that for concrete to resist the action of sea-water and to be permanent must be made so as to be absolutely impervious to sea-water. The careful engineer who has such work to construct uses every precaution, as regards his materials and quantities of water used, to obtain this impermeable concrete structure, but he probably forgets that these coarse particles of unground cement "clinker," amounting perhaps to 40 per cent. of the whole quantity of cement being used, will absorb water with avidity but will not combine with it, but will pass it on to other pieces of this coarse cement or other absorptive material that may be in contact with it, and thus in the course of time enable the sea-water to find its way into the very heart of the concrete, when destruction would probably commence. That such may be the case is borne out by some experiments on the filtration of sea-water through concrete, published as an Appendix in a paper read before the Institute of Civil Engineers* by Mr. W. Smith, M.Inst.C.E., in which it is shown that the percolation through concrete made with coarsely-ground cement is much more rapid than when made with finely-ground cement.

While on the point of impermeability of concrete, the author would like to refer to an experiment which he made for a paper read by his father, Mr. H. K. Bamber, F.I.C., &c., before the Institute of Civil Engineers in 1892. The author was once asked by an engineer who had been laying down some concrete footpaths, how it was that after a shower of rain some of the slabs, which had all been made with the same cement, seemed to absorb the water and remain wet for a long time after, while other adjacent slabs quickly became dry.

The experiment was made with an idea to discover the proper quantity of water which cement would take up when mixed as concrete, and which was found to be about 40 lbs. or 4 gallons to each cubic foot of cement used.†

"In making these experimental blocks, 5,184 cubic inches of shingle, 2,592 cubic inches of sharp sand, and 1,296 cubic inches of cement, measured separately, were mixed with 30 lbs. of

* "Minutes of Proceedings, Inst. C.E.," vol. cvii, pp. 94 and 95.
† "Minutes of Proceedings, Inst. C.E.," vol. cvii, p. 37.

water, and put into a box 18 in. cube, completely filling it without any residue. Exactly the same quantities of shingle, sand, and cement were then mixed with 15 lbs. of water, with the result that a box of the same dimensions could only hold seven-eighths of the mixture. This shows that when mixed with insufficient water the concrete occupies one-eighth more space than when mixed with the full quantity of water it can take up. Therefore there were air-spaces in the latter block equal to one-eighth of its bulk more than in the first block, which when placed under water would allow water to percolate into and through it."

This, the author thinks, will explain the cause of the dry and wet slabs in the footpath. In mixing concrete for paving, small quantities were gauged at one time to enable each slab to be placed in position and completed before setting commenced, and as the water used is not always measured, it is probable that the absorptive slabs were mixed with less water than their dry-looking brethren, and when a shower came the water passed through them and, of course, would take longer to evaporate than if only just wetted on the surface.

Illustrations.

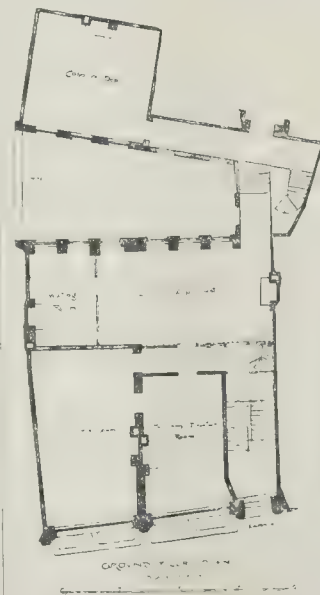
ACCEPTED DESIGN FOR THE NEW OPÉRA COMIQUE, PARIS.

WE give reproductions of the perspective view and two of the plans of M. Bernier's design for the new house for the Opéra Comique at Paris, which has received the first premium in the recent competition, and which we presume will be carried out.

We gave some remarks on the design and on the antecedents of its architect in a short article on the exhibited designs in the *Builder* for July 29, 1893. Our readers will probably agree with the remark we then made, that the design seemed to have been selected for its plan rather than for its architectural beauty, the design being indeed a commonplace one enough, and not such as we should have expected Paris to have been content with for a building of so much public interest, and from which so much was expected. The design is a respectable one, suited to its purpose, but much more than that can hardly be said. It will be of interest to our readers, however, as a representation of the selected design in an architectural competition which has excited so much interest in Paris.

OFFICES FOR THE P. & O. STEAM NAVIGATION COMPANY, LIMITED.

These buildings, situated in Leadenhall-street, are faced on the exterior with Portland stone,



Plan of Offices for the P. & O. Company, Leadenhall street.

with bands of Corsehill stone. The columns of the top story are also composed of Corsehill stone. The building is fireproof throughout, and will be lighted by the electric light. The sculpture in spandrels above the arches of the main windows is by Pegram, and the square panels below the same windows are to have paintings representing the progress of the P. & O. Company in regard to ships, the paintings being by Mr. Frank Murray. The general contractors are Messrs. Mowlem & Co., and the architect is Mr. T. E. Colcutt.

DESIGN FOR WALL-DECORATION: "PSYCHE."

THIS is a monochrome reproduction of a sketch for a nearly life-size figure in natural colour on a blue ground, the central part of the panel being darker than the border, upon which the running pattern is painted in a paler greenish-blue.

The figure is draped in white, with a salmon-coloured cloak, and a white veil with a purple border. It is designed for a wall in full light, the surface to be finished dead, and is to be painted upon canvas, and affixed to the wall in the French fashion, and then retouched *in situ* a mode of procedure from which excellent results may be obtained. The artist is Mr. F. Hamilton Jackson.

ARCHITECTURAL ASSOCIATION EXCURSION: SKETCHES.

WE give here the second set of sketches in connexion with the Architectural Association's annual excursion, of which a descriptive notice will be found in another column.

THE SANITARY INSPECTORS' ASSOCIATION: CONFERENCE IN GLASGOW.

THE proceedings in connexion with the annual conference of the Sanitary Inspectors' Association, the members of which visited Glasgow last week on the invitation of the Glasgow Police Commissioners, were commenced on the 17th inst. in the Corporation Galleries, Sauchiehall-street. About 100 of the sanitary inspectors of Great Britain were present. Mr. Crawford, convenor of the Health Committee, presided, and welcomed the members to Glasgow.

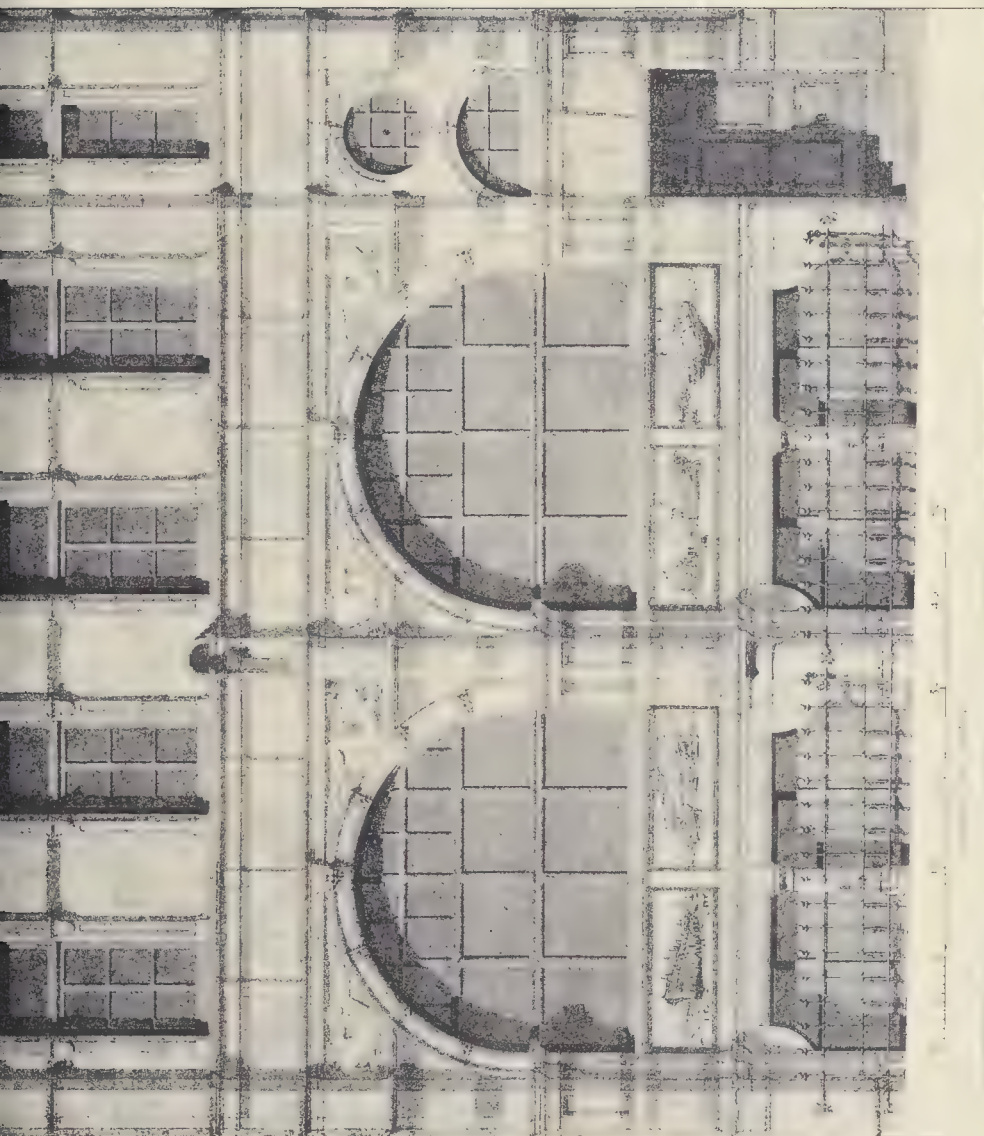
The President's Address.

In the absence of Sir Benjamin Richardson, the President of the Association, Mr. Nicol, City Chamberlain, by request of the writer, then read the Presidential address. In the course of his remarks he reviewed the past history of sanitation, and spoke of the work that lay before them in the continuance of their sanitary labour, with special reference to sanitary inspection. Dealing with the past, he pointed out the great advancement that had been made during the preceding forty years. He referred to the remarkable and important revolution which had taken place in the theory and practice of the medical art. The tendency of medicine, which a century ago was directed toward the division of diseases into many hundred forms and the formation of the most elaborate and complex nosologies, was being reversed, and the whole meaning of modern medical inquiry went to prove that disease was a unity with a variety of phenomena, and that the causes of disease were reducible to a few elementary forms. . . . A new Pharmacopoeia had come into sight, which all could read. Its principles were preventive, its objects wide, and its elements some seven only, and these, the world's great property, were no more, no less, than pure air, proper nourishment, a regulated temperature, bodily exercise, cleanliness, mental education, and good morals. Thus in some of the most important sections of the community there was a general improvement and simplification of knowledge on those great and vital questions, upon the correct solution of which so much of the world's happiness and progress rested. He referred to the advantages which had resulted from the labours of the medical officers of health and the sanitary inspectors, and stated that by different steps of progress sanitation had now become the leading subject of the day. . . . Intended reforms, to be safe, must be gradual, must be founded on actual knowledge, and must be understood in the order they were set forth. The elements of the sanitary question were few in number, but they lay deeper than was generally supposed, and many notable health measures, too temporary in their character, were scarcely



THE BUILDER, AUGUST 26, 1893

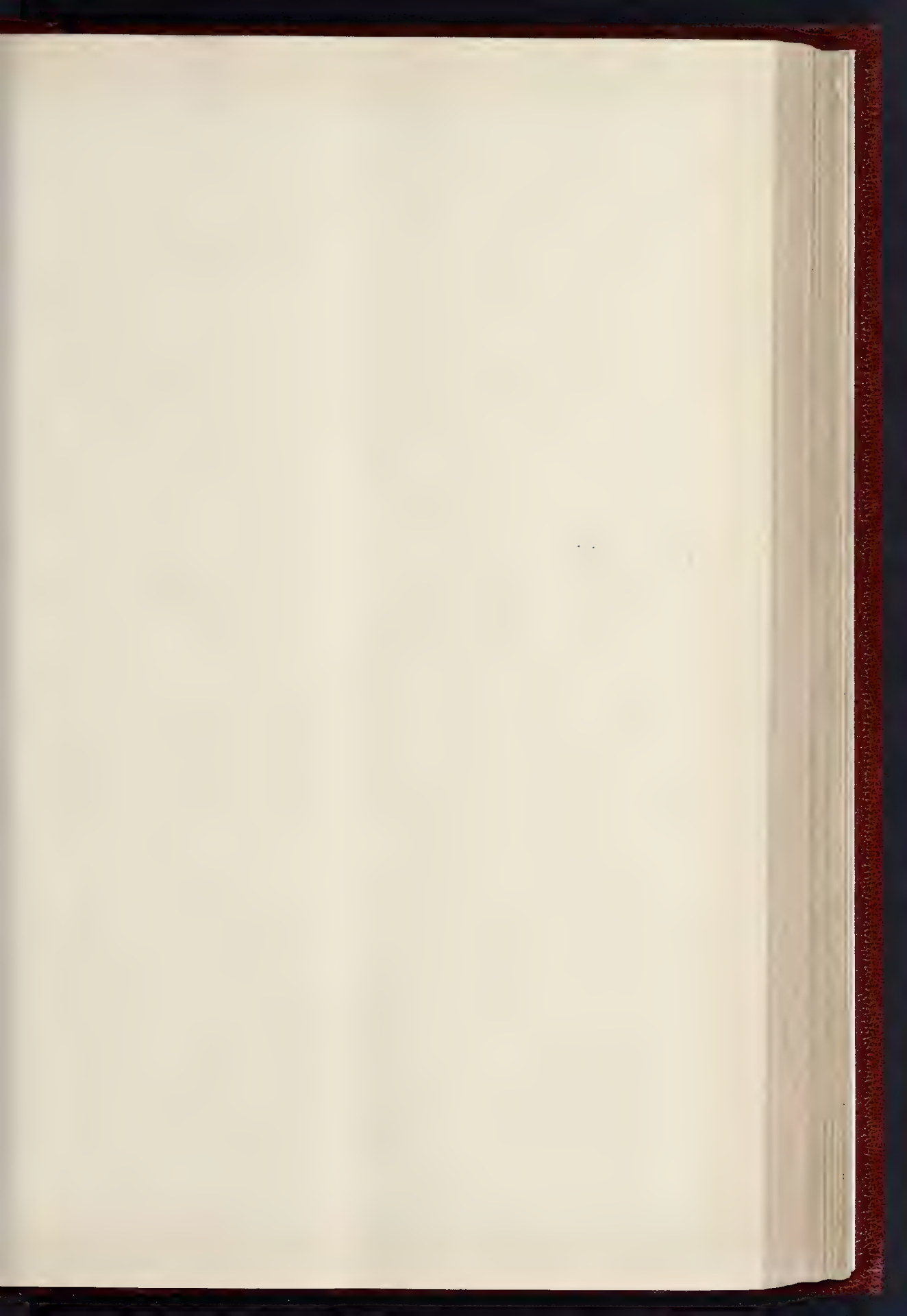


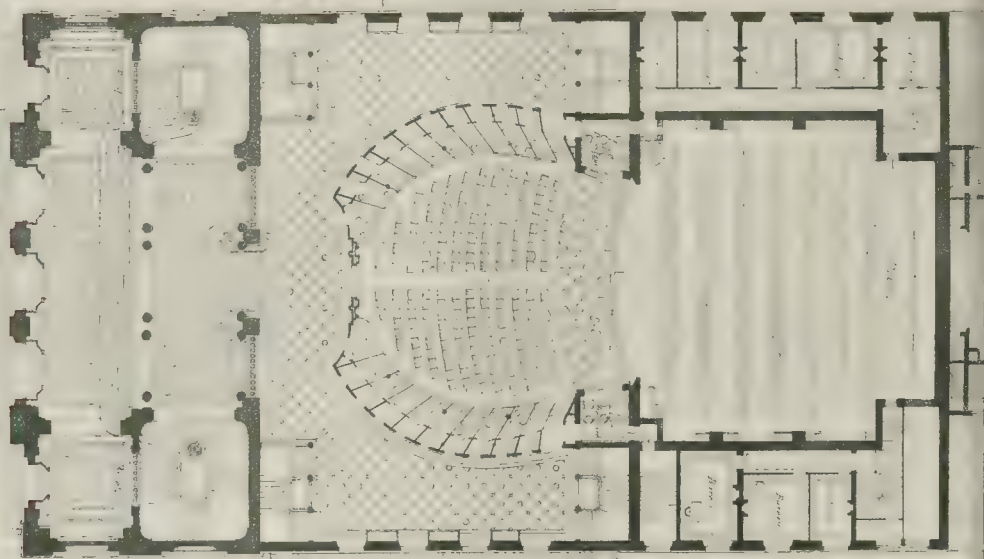


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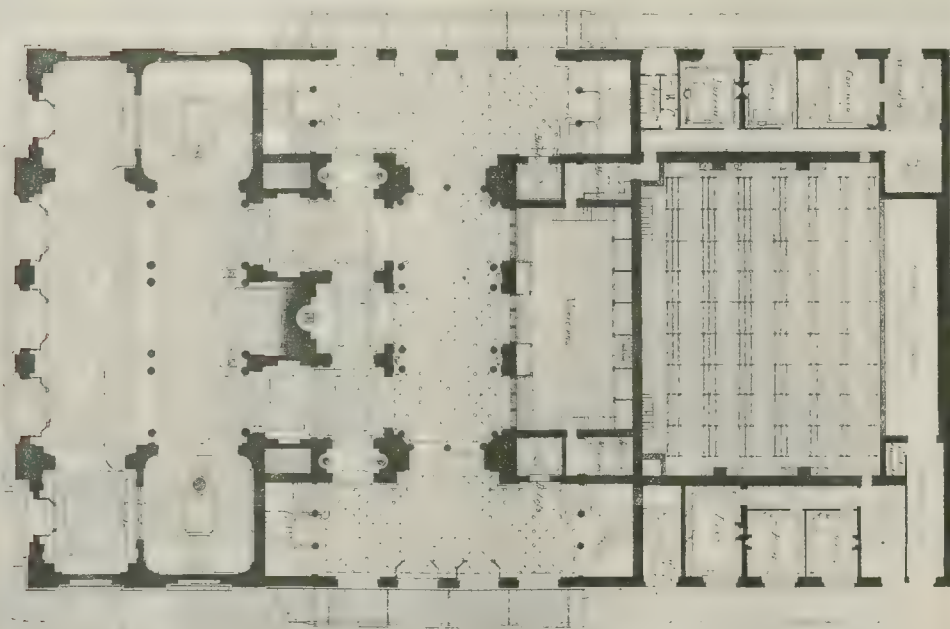








PLAN AT STALLS LEVEL



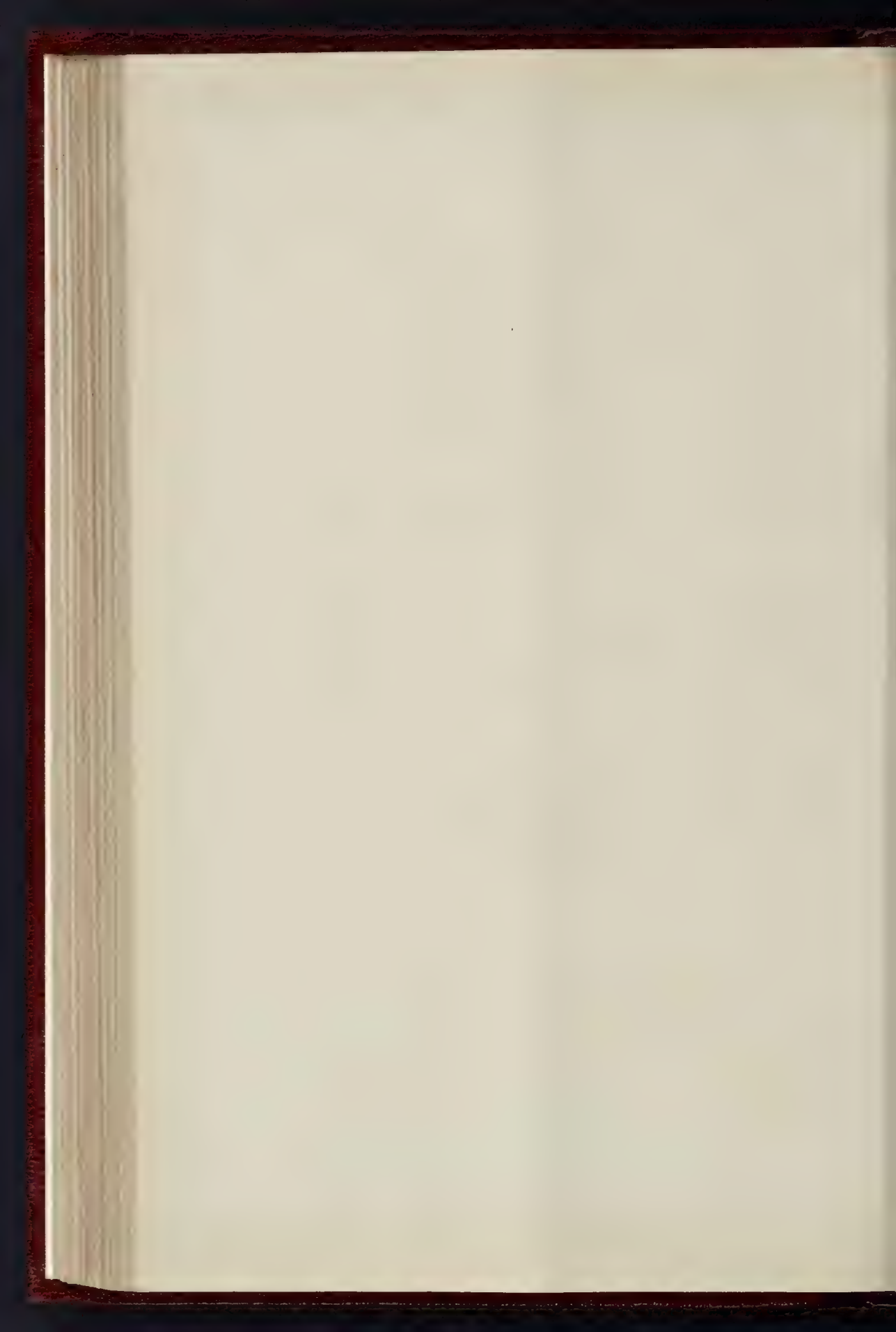
PLAN AT ENTRANCE LEVEL

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PLANS OF NEW OPERA COMIQUE, PARIS.—M. LOUIS BERNIER, ARCHITECT



SKETCH FOR WALL-Painting "PSYCHE" BY MR. J. HAMILTON JACKSON





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PARIS — M. LOUIS BERNIER, ARCHITECT

calculated to affect the great questions at issue. There was a strong feeling abroad that legislative enactments were the most capable of doing service in the preservation of health and in the suppression of disease. He would not deny that the decision in a law court might check or remove some real cause of disease, but he doubted altogether the correctness of extreme principles of coercion or compulsion—he doubted the general competency of the men upon whom devolved the duty of inflicting fines and penalties on those adjudged guilty of breaking laws of health. It seemed to him that, if a man understood natural laws of health he was not likely to break them, and he was sure that no man could be a judge who did not understand those natural laws; therefore a judge must be a sanitarian specially selected, which was not a probable, he had almost said not a possible, selection. The labours of the true sanitary reformer lay in four directions—namely (1) In an endeavour to understand simply the nature of diseases, their alliances, their true distinctive characters, the modifications to which the body was subjected under the influences of diseased action, and the chemical or physical measures best adapted for removal and prevention of disease; (2) In an endeavour to seek out primarily the causes of diseases, irrespective of the symptoms and the other details involved in the consideration of the diseases themselves; (3) In striving to make the vast stores of information already acquired in regard to the two forms of inquiry above noted accessible to all classes of society, by having them scientifically popularised and diligently taught, especially amongst the child population; and (4) In giving free scope and encouragement to those mechanical arts which tend to improve the beauty and convenience of towns and cities, to lessen muscular labour, to increase the comforts of the poor man's home, and to institute such an elevated class of amusements and occupations for leisure moments as should make the heart more happy and the mind less animal. In these offerings of reason and knowledge lay the one and true *elixir vite*, the beginning and the end of sanitary science. Principles ignored, all else was practically mere dilettantism—mere playing with details of principles, the principles themselves being undeveloped—a common error. Right honourable and honourable gentlemen might debate in the Senate House, might sit on committees of inquiry, publish tons weight of blue books, and invest magistrates with new powers, but the mortality tables of the Registrars-General would continue to tell how little could be done until a new educational impulse was given to the people leading to personal health, to health of the whole community springing from health in the unit of that community. . . . In short, in relation to sanitary science, legislation could do but one thing—namely, promote scientific sanitary education; and if it could do this, it could speedily do all that could be done. Their task as sanitary reformers for the future lay in the art of diffusing knowledge into every nature, however dense, capricious, obstinate, sullen, or indifferent; and for this task the office of sanitary inspector was particularly valuable, quite apart from its direct intention.

The Mayor of Maidstone moved a vote of thanks to Sir Benjamin Richardson for his address.

Councillor Paton seconded, and the motion was cordially confirmed.

The Tenure of Land.

Mr. Hugh Alexander, London, Chairman of the Council of the Association, next read a paper on "The Tenure of Land—A Sanitary Question." The nation as a whole was, he remarked, responsible, and not individuals or sections of the community, for the continuance of a system of land tenure which was at once an outrage upon common sense and the dictates of equity, and which, he submitted, was the primary cause of the insanitary conditions which prevail throughout the length and breadth of the kingdom. The ownership of the land was a sanitary question of the very first importance, and its adjustment in the public interest, either by nationalisation of the whole land of the country as a permanent settlement, or by municipalisation of town lands in the first instance as a preliminary, demanded the highest exercise of patriotic statesmanship for its fulfilment. Fortunately in this country the greatest revolutions could be effected constitutionally, and with due regard to all interests affected thereby; and so it would, no doubt, be when the great impending revolution in the tenure of land took place. But if it appeared to anyone that private interests would be in danger, then he

would remind him that the law as it stood sanctioned the acquirement by Local Authorities of both land and dwellings in areas shown to be in an insanitary condition and prejudicial to the public health, and that had been largely done in Glasgow, in the metropolis, and in other centres of population; and every man's interest in properties dealt with in such areas had been purchased or had received proper compensation, and it might fairly be assumed that an extension of that principle, so far as the ownership of the land was concerned, to the whole area of towns and cities would be found quite practicable, and should within a given time be made compulsory upon Local Authorities, coupled with power to acquire adjacent lands needed for town expansion at just valuations. If that were accomplished leaseholders and other renters would at once become the tenants of, and pay rent to, the Local Authorities; for which purposes the existing rate-collecting machinery would be immediately available for collection of rents and other details. Some of the immediate and very obvious results of the ownership of town lands being thus assumed by public bodies would be that improvements in ground values would benefit the whole community, and the vexed question of rating ground values would settle itself. Building leases might still be granted, but perhaps on more equitable terms than at present; and with power given to Local Authorities to purchase adjacent lands for town expansions at fair valuations there would be no necessity nor incentive to crowd houses on area.

The Rev. Robert Dickson moved a vote of thanks to Mr. Alexander.

Mr. P. Fyfe, in seconding the motion, pointed out that it must not be forgotten that the people themselves were to a very large extent to blame for their insanitary conditions. In Glasgow he could make very powerful comparisons between houses on the same landing; at the same time there were some houses so situated that it was impossible to put the inhabitants in a proper sanitary condition.

The motion was then adopted.

The first day's sitting was brought to a close with a vote of thanks to the Chairman, on the motion of Mr. A. Hay.

The members were afterwards entertained to luncheon by the Corporation, and subsequently they drove in open carriages from the Corporation Galleries and visited the Kelvinhaugh Refuse and Despatch Works, Belvidere Hospital, Clyde-street (Calton) Model Lodging-House, and Greenhead Baths and Wash-houses.

The Conference was resumed on the 18th inst., Bailie Ure Primrose, Glasgow, was Chairman for the day, and in opening the proceedings he briefly reviewed the progress that has been made in practical sanitary work in Glasgow during the last thirty-five years. In Berlin and other Continental cities they were striving to-day with many problems that were faced in Glasgow thirty years ago. Among the chief works undertaken in the city he mentioned the water supply scheme, which, he said, at once cut down the death-rate perceptibly; the hospitals for infectious diseases, the City Improvements scheme, the Buildings Regulation Act, and the works now under construction for dealing with the sewage of a part of the city. In reference to the last-mentioned, he said he believed that before long they would go for a complete scheme, not for Glasgow alone, but they would take means to have the whole valley of the Clyde created a Conservancy Board, so that their beautiful river might be restored to that condition of purity in which bountiful nature gave them it.

Councillor James Dick, Chairman of the Hospitals Committee of Glasgow Town Council, spoke of that department of sanitary work coming under his notice in his official position. He held that they ought to have a Notification Act compulsory over the whole country; that they ought to have infectious disease hospitals for each local authority by itself, or combining as best suited them, and that these ought to be compulsorily obliged to provide infectious disease hospitals; and finally, that, with properly guarded provisions, there should be the power compulsorily to remove patients infected with infectious diseases to these hospitals, so that the community might not suffer.

The Sanitary Inspector and his Vocation.

Mr. Peter Fyfe, Chief Inspector of Glasgow, next read a paper on "The Sanitary Inspector and his Vocation." The day in the history of the world, he said, to which might be credited the birth of the first sanitary inspector was unknown. But undoubtedly the man in this kingdom who did most in evolving the inspector and his duties from a hygienic chaos was the late Sir Edwin

Chadwick. Scotland in 1888 lost 17,670 persons from preventable disease. The reduction of this "slaughter" was the *raison d'être* of the vocation of the sanitary inspector. That vocation was to keep the country clean, and a vaster problem was not set before any body of men. An ever-increasing net-work of sanitary law had been and was being spread around our increasing populations with a view of keeping premature disease and death at a minimum; but the irreducible minimum was yet far from being reached, and there were still certain individuals and bodies of men who desired to retard the process. The position of medical officers and sanitary inspectors, he proceeded to show, was greatly elevated by the passing of the Local Government (Scotland) Act of 1890, by which the tenure of their positions was secured against the *laistes faire* local authority. The result given during the short time since the Act came into operation had been marvellous. Plain spoken and fearless reports had been issued by both sets of officers, regardless of local or any other interest but that of the great body of the people. These served as the index finger to the pathways by which the central authority of the future was to advance. In England the sanitary inspector was not in so good a position. It was not to be desired that men whose duty it was day by day to enforce the Sanitary Acts against big and little should, even if overshadowed by theegis of a quasi-State protection, do otherwise than walk warily. But by leaving them without appeal to the effects of organised sinister interests, as they could be expressed through the action of vestries or local boards, was to encourage the degeneracy of the official, and tended to convert his tact and courtesy into neglect and weak concession. The value of the sanitary inspector's vocation to the public had been immensely enhanced since the passing of the local government measure, and it lay with England to give her people and her inspectors similar benefits. The external equipment of the sanitary inspector was a legal power to inform three parties at three different periods that there existed a condition of things at a particular place dangerous or injurious to the health of the people; but he complained that the summary removal of nuisance was hopeless in the present state of the law. A want in the external equipment of the sanitary inspectors in many parts of the country was efficient assistance. Many chief inspectors were obliged to fritter away their time in running from one case of infectious disease to another, doing work which could be done equally well by a trained subordinate. In conclusion, Mr. Fyfe adverted to the necessity of provision being made for the training and equipment of sanitary inspectors. At present there were no proper technical or other colleges where young men might learn not only the principles, but the practice of sanitation. He trusted that by their united representations at headquarters they might be able to induce Government to issue a grant to all technical colleges and schools, in order that good teachers, with adequate appliances at hand, might be able to impart the technical knowledge and learning so urgently required. Not until this, or something equivalent to this, had been done would the public, or the local sanitary authorities who represented them, be secured in a proper choice from among candidates for the posts which fell vacant.

Improvements in Sanitary Law.

Mr. W. Wilkinson, chief sanitary inspector of Derby, next read a paper on "Needed Improvements in Sanitary Law." The Scotch representatives, who were always awake to safeguard the interests of Scotland in the Imperial Parliament, had, he said, secured for their officers in the Act of 1867 the designation of "sanitary inspectors." They had also set an excellent example in creating sanitary inspectorships, and giving permanent tenure of office to sanitary inspectors, both of which provisions he hoped to see extended to the rest of the kingdom. He spoke of the work done by the sanitary officers, remarking that they were now more than mere scavengers, and he urged that it was desirable that they should have a thorough education in the methods of construction, lighting, ventilation, water supply, drainage, and in all classes of building. Having alluded to the supineness of many of the sanitary authorities in discharging their duties, and pointed out that it was open to them to fill the position of sanitary inspector, irrespective of the fitness of candidates, he urged the desirability of having one examination only, to be held by the Government, as a test of theory, after the candidate had had a

thorough practical training. It was generally supposed that the inspector was empowered by the law to take at once all needful steps for the removal of anything offensive or injurious. This was not the case. They frequently came across instances where a nuisance should not exist hours, much less days or weeks, yet they were powerless to insist on a remedy until they had the sanction of the Local Authority to take legal steps. He further contended that the salaries paid to many of the sanitary officers in England were utterly inadequate, quoting instances, and argued that as the authorities had frequently no idea of their powers and responsibilities, the only chance of securing sanitary administration was to enact a minimum salary for the sanitary inspector, to require him to give his whole time to his work, and freedom to do his duty. In concluding, he moved the following resolution:—

Resolved that, in view of the disabilities under which sanitary inspectors discharge their duties, this meeting is of opinion that the interest of the public health within the United Kingdom would be largely promoted by the enactment of the following amendments in sanitary law:—

(1) That all officers now variously named sanitary inspectors and officers of nuisances be designated sanitary inspectors.

(2) That every accepted candidate for the position of sanitary inspector within the United Kingdom shall possess a certificate of competency in sanitary law and practice, such certificate to be granted only by examiners appointed by Government.

(3) That the sanitary inspectors of England shall be elected to permanent tenure of office, and shall only be dismissible for misconduct or proved incompetence, with right to appeal to the Local Government Board, as it is now provided for Scottish inspectors under the Local Government (Scotland) Act, 1889.

(4) That in reference to the Public Health Acts of England it shall be the duty of sanitary inspectors to inspect the districts to which they are appointed, to receive complaints of nuisances and serve notices forthwith requiring all necessary works to be done for the abatement of nuisances, such notices to be as valid, if confirmed by the Local Authority, as if served by the Authority's order.

(5) That sanitary inspectors shall be required to give their whole time to the duties laid upon them by their Local Authority, and that an adequate minimum salary be prescribed.

(6) That the Superannuation Allowances Act, 1866, 29 Vic., cap. 31, which applies to the metropolis only, be extended to include the officers of all urban and rural sanitary authorities within the United Kingdom, and that the said Act be amended, giving thereby to all officers a legal claim to superannuation.

Mr. Thomas George Dee, Westminster, London, seconded the motion; and after remarks by Messrs. West, Walthamstow; Jennings, Rotherham; Lindsay, Mid-Lothian; and Gerrard, Liverpool, it was unanimously adopted.

On the motion of Councillor Langlands, votes of thanks were passed to Mr. Fyfe and Mr. Wilkinson for their papers.

The members then adjourned to the adjoining hall, where luncheon was served.

The Land Laws.

On the conference resuming—Councillor Crawford in the chair—Mr. Alexander, in terms of notice, proposed:—

"That this meeting is of opinion that the land laws of the United Kingdom as at present in force stand in the way and obstruct the moral and physical redemption of the people, and are the primary cause of the insanitary conditions with which the nation is afflicted."

The motion was duly seconded, but a number of members took exception to the subject being brought forward, and ultimately Mr. Alexander withdrew his motion.

On the motion of Mr. Fyfe, a vote of thanks was passed to Mr. Crawford for the way in which he had conducted the business of the conference, and the proceedings were brought to a close.

In the evening the members of the Association were entertained to dinner in the Banqueting Hall of the Municipal Buildings by the Lord Provost, Magistrates, and Town Council.

PUBLIC IMPROVEMENTS, HALIFAX.—On the 16th inst. Colonel Hasted, of the Royal Engineers, held inquiries at the Halifax Townhall on behalf of the Local Government Board, relative to the Corporation's application for sanction to borrow 30,000l. for purposes of electric lighting, and 21,393l. for sewerage and street improvements (including the diversion of the Hebble Brook). In relation to the proposed electric plant, Mr. Wilmshurst, the electrical engineer to the Corporation, explained that the intention was to lay down plant at the gasworks sufficient to give 10,000 lights within the Borough, but mains of a capacity of 30,000 would be laid beneath footpaths. It was not intended to light the streets in this way.

THE CAMBRIAN ARCHÆOLOGICAL ASSOCIATION AT OSWESTRY.

THE forty-seventh annual meeting of this Association was held at Oswestry on Monday, August 21, and four following days. Oswestry, although not actually within the borders of "Gallant Little Wales," is sufficiently near to be in the once debatable territory known as the Marches, and, therefore, the Association cannot be considered as having gone outside its own peculiar province in visiting this district. The "Wynnstay Arms," which was chosen as the headquarters of the Association, is opposite the church of St. Oswald. The association of the place with the name of the saintly king of Northumbria recalls the fact that Oswestry shares with another locality near Winwick, in Lancashire, the honour of being the site of the battle of Maserfield, in A.D. 642, in which Penda, the pagan ruler of Mercia, was victorious over the Christian Oswald.

The country round Oswestry is well wooded, but in other respects comparatively tame. To the antiquary its situation is interesting as lying between the great earthen ramparts known as Watt's Dyke and Offa's Dyke, which run nearly parallel to each other right away from here to the coast of Flintshire.

The proceedings of the Association opened on Monday evening with the address of the President, Mr. Stanley Leighton, M.P., F.S.A. It is a great merit in a President, on an occasion of this kind, that he should not only be a person of influence in the neighbourhood, but that he should be an accomplished archaeologist as well, and Mr. Stanley Leighton combines both qualifications. The President, in his address, omitted all reference to the battle between Penda and Oswald, and thus avoided touching on a difficult question. He lamented the removal of Welsh antiquities and historical MSS. to the Record Office and to the British Museum, and pointed out that much of their value was lost when they were thus dealt with. Mr. Henry Taylor, F.S.A., of Chester, suggested that the county councils should be made the guardians of ancient monuments and MSS., and should be empowered to spend money on printing documents of local interest. Amongst other speakers were Mr. Milman, Director of the Society of Antiquaries, the Venerable Archdeacon Thomas, F.S.A., and the Mayor of Oswestry, Mr. A. Wynne Corrie. The latter gave some facts with regard to the rise and progress of archaeological societies, not the least remarkable being, that the first institution of the kind was founded in Ireland in B.C. 590.

The principal object of the excursion on Tuesday, August 22, was to visit Chirk Castle, which lies seven miles north of Oswestry. The first stop made on the way was at the large British earthwork called in English Old Oswestry, and in Welsh "Hên Dinas," about a mile out of the town. Another name for the fortress is "Caer Ogynfan," but on the question of whether Ogynfan was a mythical hero of the Arthurian type or not those present were unable to throw any light. Unfortunately, just before the party reached Old Oswestry the rain began to fall in torrents, notwithstanding which the venerable Archdeacon Thomas conducted a small band of enthusiasts through the entrance in the ramparts into the interior of the fortified area, and there discoursed on the military enterprise of the people who had erected this gigantic work. The hill on which Old Oswestry is situated is 540 ft. above sea level, and some 200 ft. above the surrounding country. The earthwork consists of three ramparts of great height, enclosing an almost level platform of roughly oval shape on the top of the hill. The area within is a lawn of greensward, but the ramparts are all planted with trees, which considerably detract from the imposing appearance of so large a structure when seen from below. Watt's Dyke joins the ramparts on the west side.

The only other stop made between this and Chirk Castle was at Weston Hall (three and a-half miles north of Oswestry), a good specimen of the half-timbered domestic architecture of the district, with an ancient carved oak staircase and small hall with open timber roof in the interior.

A mile and a-half north of Weston Hall the road dips down into the deep valley of the river Ceiriog, which here forms the boundary between Shropshire and Denbighshire, and crosses it by a small bridge at the bottom of the steep descent. Looking down the valley to the eastward, two great high-level viaducts are seen, one behind the other, which serve to carry the Shrewsbury and Chester Railway and the Ellesmere Canal across the pine-clad ravine. The latter, which is the

lower of the two, is one of the engineering triumphs of Telford.

By eleven o'clock Chirk Castle was reached, in a thunderstorm, and the members were not sorry to take shelter under the hospitable roof of Mr. R. Myddelton Biddulph until the weather cleared up. A couple of hours soon passed in examining the castle and the art treasures it contains. The castle is built round a rectangular courtyard, and the chief feature which gives a special character to the exterior are the drum towers unusually large size at the angles. As in some of the French châteaux, multilioned windows of the Renaissance period have been inserted in their round towers of more ancient date, to adapt them to the living requirements of the subsequent occupiers. The entrance is on the north side, and their first room entered is the billiard-room, on the ground floor, which contains a collection of ancient armour. From this access is gained to the second story by a square well staircase in one of the drum towers. The principal rooms are on the north and east sides of the quadrangle on the second floor. They are of magnificent proportions, and beautifully decorated by Crace. The restoration of the building was undertaken by the elder Pugin. The windows are all multilioned, and with broad seats in the thickness of the wall on the inside. One of the most valuable treasures in the Castle is a splendid ebony cabinet, ornamented with silver repoussé work, and the doors painted on the inside, said to have been the gift of King Charles II. to Sir Thomas Myddelton. Their chapel at the south-east angle contains a fine eagle lectern. The oldest part of the Castle is the drum-tower at the south-west angle, with a gloomy dungeon in the basement. This is a thirteenth-century work, as indicated by their pointed doorway and lancet windows.

In the garden were seen a beautiful slab with a floriated cross and inscription in Lombardic capitals, and a font used as a flower-pot. Surely these might with advantage be placed within the chapel out of harm's way. One of the pictures at the top of the staircase leading to the principal rooms has a curious story connected with it. The scene represented is the great waterfall of the district, called Pistyll Khawad, but although many miles inland the sea and ships are introduced in the background. The painting is by a French artist, and the explanation of the marine accessories is that when the artist was at work a Welsh shepherd, looking over his shoulder, observed, "You should paint some ships (meaning sheep) about," and sure enough he did, taking the advice in a somewhat different sense from which it was intended.

After admiring the extensive and charming view from the terrace of the castle, the members rejoined their carriages and returned through the park to Chirk, having an opportunity on the way of admiring the beautiful demesne, with its deer browsing amongst the bracken fern, and the unique wrought-iron entrance gates.

The remainder of the day turned out fine. After luncheon at the Hand Hotel, at Chirk, the church of no particular interest, except for some traces of Norman work on the south side, and a mound—possibly a Saxon mote—were inspected. From Chirk the party proceeded through Gobowen to Whittington Castle, three miles north-east of Oswestry. Here there is a mediæval castle built on the site of a Mercian stronghold of the Saxon period. The remains are not extensive, but the fine trees behind, and the duck-pond between it and the road, make it worthy of an artist's attention.

The day's proceedings terminated with a visit to Park Hall, the residence of Mr. A. Wynne Corrie, the Mayor of Oswestry, and Chairman of the Local Committee, where the members were hospitably entertained to afternoon tea in a tent on the lawn. Park Hall is well known as one of the best examples of a half-timbered house in Shropshire.

At the evening meeting a paper was read by Mr. J. Parry Jones on "The Story of Oswestry Castle," and the Corporation charters and plate were exhibited.

We will continue our report of the meeting next week.

MESSRS. ADAMS & CO., SANITARY SPECIALISTS, of London, &c., have this month opened larger premises at 107, St. Vincent Street, Glasgow, where most of their patents may be seen in action.

REVEREND FREDERICK CHURCH, SOMERSETSHIRE.—On the 13th inst. the dedication took place of a reredos in Uphill Church. The reredos, which is of oak, is of Gothic design, and was carved by Mr. John Northcott, of Ashwater, Devon. The paintings are by Meyer & Co., and consist of five panels.

Correspondence.

To the Editor of THE BUILDER.

SIPHONS.

SIR.—Is there any formula or table for calculating the least quantity of water necessary to pass over the weir of siphons of various sizes, in order that the siphon shall begin to act? I believe that the larger the siphon the larger in proportion is the necessary quantity. The sizes about which I want particular information are $1\frac{1}{2}$ in., $2\frac{1}{2}$ in., 3 in., and 4 in. drain. B. D.

CHIMNEY DESIGNS.

SIR.—We are now erecting a circular brick chimney about 250 ft. high, 20 ft. diameter at bottom, and 9 ft. 6 in. diameter at top. Being in a comparatively level region almost destitute of chimneys, and thus forming a very prominent object in an extensive landscape, it will be an eye-sore over the whole district if it has the ugly head which surmounts so many of our English chimneys. We have made many fruitless efforts to get a design of a handsome head, and would be glad if any of your readers could point us to any published work which gives a selection of chimney-head designs.

MANUFACTURERS.

** It is most creditable to "Manufacturers" that they should wish to make their chimney an ornament instead of an eyesore to the district. There are architects who could help them to that if they were fortunate enough to find the right people. As they ask for a book, the only one we can tell them of that is worth anything is an American collection of designs reviewed in our columns in the *Builder* of June 10, 1893, and published by the *Engineering Record* (New York) under the title "Water Tower and Pumping Power Station Designs." This was a book of sketch designs for chimneys, not for heads only, but it may afford some hints.—Ed.

The Student's Column.

GEOLOGY.—IX.

ORIGIN AND STRUCTURE OF AQUEOUS ROCKS.

IN a former article we gave some account of the origin of aqueous rocks in general, which was sufficient for the purpose then in hand; but they demand greater attention. It is not enough to speak of aqueous rocks generically, we must specify the principal kinds in some detail. The importance of this group will at once be understood when we state that not only do nearly all the building stones fall thereunder, but the choice of sites for houses, reservoirs, railways, canals, and embankments, also many questions relating to water-supply, drainage, and sanitation, in a large measure hinge on our knowledge of the structure and disposition of the aqueous rocks. It is admitted by all geologists that the most rapid method of obtaining elementary knowledge concerning them is to learn something of their mode of origin, though in the more advanced stages of the subject their structure must be first considered.

The origin of the different kinds of aqueous rocks is best arrived at by studying the deposition of sediment, &c., now taking place in the sea adjacent to the shore, in rivers and lakes. We take it for granted that by this time the student understands, in a general way, that the land is being ceaselessly worn away by what are termed the "agents of denudation" (which will be described in a future article), and that the material so detached from the surface of the country, and elsewhere, is carried away by the sea, or rivers, and finally finds a resting place by being dropped or "deposited."

The following diagram (fig. 1) will serve to

explain what becomes of the material derived from the gradual destruction by denudation of a sea-cliff made of rocks, which yield to the action of the weather with tolerable ease. It will be perceived that the rocks composing the cliff are continued under the sea, and at one time formed the sea-floor. The portion under water enjoys comparative immunity from destruction, but the denuding agents are ever at work on the exposed parts above the sea-level. They cause the cliff to crumble away, and the beach, consequently, is continually strewn with fallen blocks and fragments, masses of earth, and the like. This detritus the sea eagerly devours in its attempts to clear the beach; the finer particles of earth are transported with facility by the water, but the larger fragments and blocks are much more refractory. The untiring energy of the waves, however, soon reduces even them to such a moderate size that they may be moved, and these in their turn are then made smaller by being continually rolled up and down between tide-marks. These rolled stones or pebbles are employed by the sea in a dual capacity. During storms they are used as ammunition, being caught up by the mighty rollers and hurled with great force against larger blocks, or the solid sea-cliff, when they break up the latter and become themselves shattered, or further reduced in size. The knocking of stones against each other, caused by the continual rolling, slightly chips them and minute fragments of sand are thus provided which may ultimately be taken away by the waves from the beach.

The transporting power of the sea is, of course, controlled by the velocity of the water and the weight of the material to be carried or rolled along. When the velocity of the water, being gradually diminished in receding from the shore, becomes insufficient to keep the particles in suspension, they drop by their own weight, and are deposited on the sea-floor, their accumulation eventually forming a bed of considerable thickness. Thus, on removal from the shore it will be readily understood that the finest and lightest particles will travel farther under water than will the grosser pieces, and that the debris from the cliff is roughly sorted out by the sea, according to its specific gravity. This principle is well exemplified in fig. 1. The beach is strewn with large blocks; between tide-marks there is a bed of gravel; this is succeeded by small pebbles which pass insensibly into smaller pieces called grit, then into coarse sand, fine sand, sandy clay (or sand and mud), and eventually into clay, or mud. The whole of the deposits may be, and often are, laid over a vast area—the fine clay may be many miles distant from the beach.

From the foregoing it is evident that the deposition of sediment can, normally, only take place within a few miles of the shore, though the distance may slightly vary owing to the action of disturbing currents, especially in shallow water. Beyond the point where this deposition ceases, another kind of formation sets in. The sea is inhabited by countless millions of animals, and as these die, their hard parts, shells, &c., accumulate and make thick beds. The relative position of these shelly deposits is indicated in the diagram. At the point of junction between *f* and *g*, the clay and shells are mingled together, and the remains of marine organisms, naturally, are found more or less in all deposits up to the beach. Marine formations of the kind indicated—especially the sands, clays, and shelly beds, often occur of enormous thickness—several hundreds, in some cases thousands, of feet.

Hitherto we have dealt almost exclusively with the disposal of sediment derived from the sea beach; but sediment is also discharged into the sea at a river's mouth, the material having been obtained from the land through which the river flows, and carried to

the sea by the movement of the stream. The shoals at the mouth of the river Thames, for example, have been formed in that manner. We have, however, much grander illustrations of the transporting action of river water in the deltas of the Ganges, Brahmaputra, Nile, Rhine, and Mississippi. Nearly the whole of Holland is in reality the delta of the Rhine, which accounts for the flat and swampy nature of the country, and the peculiar and difficult kinds of foundations met with in building.

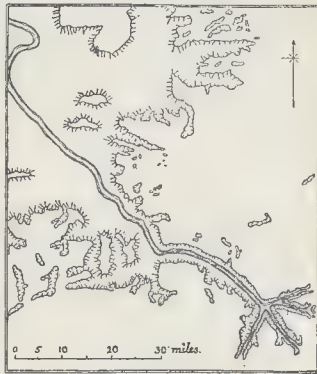


Fig. 2. —Delta of the Mississippi River.

The delta of the Mississippi (fig. 2) is, perhaps, the most important—it certainly is the most striking—example of the formation of deposits at the mouths of a large river. Messrs. Humphreys & Abbott state* that the area of this vast expanse of alluvium is 12,300 square miles, and it advances at the rate of 262 ft. yearly into the Gulf of Mexico at a point which is now 220 miles from the head of the delta. The bar forming at the South-West Pass of the river is equal in bulk to a solid mass one mile square and 490 ft. in thickness, and it advances at the rate of 338 ft. per annum. It consists mainly of sediment pushed along the bed of the river. Sir Archibald Geikie, F.R.S., remarks† that the upper reaches of the Adriatic Sea are being so rapidly shallowed and filled up by the detritus brought down by the Po, Adige, and other streams that Ravenna, originally built in a lagoon like Venice, is now four miles from the sea, and the Port of Adria, so well known in ancient times as to have given its name to the Adriatic, is now fourteen miles inland, whilst on other parts of that coast-line the breadth of land gained within the last 1800 years has been as much as twenty miles. The nature of the deposits of which deltas are formed may be gathered from accounts of borings for water near Venice, which reached a depth of over 570 ft., and disclosed a succession of nearly horizontal clays, sands, and ligniferous beds, the whole indicating an alternation of marine and terrestrial or fresh-water conditions. The sea fronting the Amazon is discoloured for 300 miles by the mud of that river.

The material derived from the denudation of the land is, however, deposited in other situations by rivers than in their estuaries; a certain amount accumulates in favourable spots along the river course, and the formations thus made are known as *fluvialite*. Such deposits are commonly associated with rivers of little velocity (and consequently with a meandering course), and are often spread over the whole breadth of the valley, as is shown in Fig. 3, which represents a section across the river Ouse to the east of Bedford, from Ravensden to Summerhouse Hill.



Fig. 3.—Section across the River Ouse, East of Bedford.

a Alluvium, or mud deposit. b River gravel. c Boulder clay. d Oxford clay. e Great Oolite.

Many English cities are built in valleys on the gravels, sands and silts formed in past times

* "Report on the Mississippi River," 1867.

† "Text Book of Geology," 1882, p. 390.

Fig. 1.—Section of Shore and Sea-floor to show deposition of Aqueous Rocks.

a—Beach gravel. b—Small pebbles. c—Grit. d—Sand. e—Sandy clay. f—Clay. g—Shelly deposit.

by the action of rivers, and the student will see that this is closely connected with the subject of foundations. As river deposits are so local, they vary materially, even in short distances, in their general character, and he will choose the best foundation who knows most concerning their nature and distribution.

Lakes into which streams discharge their burden must in course of time be filled up; deposits of this nature are called *lacustrine*. The river Rhone, for example, enters the Lake of Geneva as a very muddy river, but emerges from it as clear water. In this case the lake is acting as a kind of settling-tank, the mud being deposited therein in vast quantity, which is gradually filling it up; the time will come when that body of water will be entirely obliterated. Ground made in this way is generally marshy, unwholesome, and forms very treacherous foundations.

OBITUARY.

MR. L. J. DESSURNE.—We regret to have to record the sudden death of Mr. Louis J. Dessurne, the sub-editor of the *Builder*. The deceased, who was forty-nine years of age, was taken ill less than a fortnight ago with an attack of rheumatic fever, from which he was recovering; but on the 18th inst. he suddenly expired, the immediate cause of death being failure of the heart's action. Mr. Dessurne has been connected with the *Builder* for the last eighteen years, first as reporter and subsequently as sub-editor. Some remarks on his work for this journal will be found among our Notes of this week.

GENERAL BUILDING NEWS.

SALVATION ARMY CHAPEL, ABERDEEN.—On the 17th inst. the foundation-stone of the new Salvation Army Chapel, Aberdeen, was laid by Lady Aberdeen, assisted by the Earl. The building is in the Scotch Baronial style, and has a frontage of 150 ft. by an average depth of 100 ft. The material used for the construction will be of Kemnay granite. The building will provide, on the first floor, a hall to accommodate 1,500 persons, and offices for the carrying on of the work in the north of Scotland. Dwellings are also provided for the officers. One of the main features of the elevation is the tower 25 ft. square, which rises above the main building to a height of 150 ft. The total cost, when the work is completed, will be about 22,000*l.* The building has been designed by Mr. James Souttar, architect, Aberdeen.

RESTORATION OF WITHEYBROOK CHURCH, WARWICKSHIRE.—On the 16th inst. Witheybrook Church was reopened, after restoration by the Bishop of Coventry. The church was built in the latter part of the fourteenth century, but there are many additions of the fifteenth century, and the architecture includes Early English, Perpendicular, and Decorated styles. The building has a large chancel, and a short nave with north and south aisles. The tower—a low, square one, standing at the west end—is without a spire. The church had been so dilapidated that it was closed in October, 1889. It has been entirely re-roofed, the pillars and walls have been cleaned to expose the original surface, and the latter pointed, and in re-glazing the windows all the ancient glass has been used again. It has been necessary to renew all the woodwork except the pulpit and the altar, which have been retained. Previous to the alterations there were seats for 107, now there are 171. The tower has been strengthened and made watertight, and the church furniture has been augmented by several memorial gifts. It still remains necessary to reseal the chancel and repair the bells. The work has been carried out by Messrs. Law & King, of Lutterworth, under the superintendence of Mr. E. Turner, architect, Leicester.

CONVALESCENT HOME, WOODHOUSE, LOUGHBOROUGH, LEICESTER.—The Duchess of Rutland laid the foundation-stone recently of the Charnwood Forest Convalescent Home, which will be situated near Woodhouse. The building is situated on the west side of the Beck Hill-road, midway between Nantpantan and Woodhouse. The altitude of the site is 430 ft. above ordnance data. The building is being erected of the local Forest stone, and faced with red sand-faced bricks to the doors, windows, and corners, and with a brick lining on the inner side, all the external walls to the main building being erected with a 2-inch cavity between the stonework and the inner lining. On the front of the building a verandah, 7 ft. 6 in. wide, runs the entire length. This is partly covered with glass. The building consists of ground, first, and second floors, with a corridor running the entire length of each. The entrance hall—27 ft. by 16 ft.—is approached from the centre of the verandah, and will be available as a committee room, and will be the men's and women's corridors by swing-doors. The remainder of the front consists of three sitting-rooms and matron's room. The back portion of the main building ground floor consists of dining-hall, capable of seating fifty-six persons; sitting-room, china and store-rooms. Main staircases at either end lead to the men's and women's bedrooms. At

the rear are kitchen, scullery, larder, and other offices opening into large paved yard, at the side of which a coach-house is being erected. Lavatory accommodation, lined with white glazed bricks, is provided for both sexes at either end of the building. Provision and store cellars with heating chamber are provided in the basement. The first floor is so arranged that the bedrooms open direct into the main corridor, and consists of nine bedrooms, store-room for patients' clothes, bathrooms, housemaid's closets, &c., and by the arrangement of doors in the corridor, a portion of the women's bedrooms can be made available for the men's accommodation if found necessary. The second floor is approached by the continuation of the staircase on the women's side, and contains seven bedrooms and cistern-room, with corridor. It is proposed to devote the whole of this floor to the women patients. In regard to the ventilation of the building, fresh air inlet tubes are introduced where required, and exhaust flues connecting each room, running into the chimney shaft, and the windows are open to the ceiling level. The house is designed for forty-five patients. The sitting and bedrooms will be heated by open firegrates, and the corridors and dining-hall by hot water. The water for the Home is being lifted by a three-throw wheel pump from the filtered water well at the Nantpantan reservoir through a 3 in. rising main, and is now supplying water for the building operations. Brindle tile will be used for the roofs, and will be supplied by Mr. J. Peake, Tunstall; the bricks for facings from Messrs. Tucker & Son, of Loughborough, and the stone from Messrs. Drabble & Co., of Eury Darley Dale quarry. The cost of the structure complete will be about 6,000*l.*, and the contract is being carried out by Messrs. W. Moss & Son, of Loughborough, under the direction of the architect, Mr. Geo. H. Barrowcliff, of Loughborough.

BOARD SCHOOL, CARDIFF.—On the 14th inst. a new board school was opened at Saltmead, Cardiff. The walls of the building are faced with Newbridge stone, with dressings and string-courses of brick and Bath stone. Accommodation is provided for 380 girls on the ground floor of main block, there being two class-rooms capable of holding 70 in each, and four with accommodation for 60 respectively. A corridor 70 ft. long by 11 ft. wide is provided in the centre of this block, and the several class-rooms open from this. The space allotted for hats, cloaks, and lavatory accommodation also opens from this corridor, and at one end a room for the teachers with store and other necessary accommodation is provided. The boys' school is situated on the first floor above the girls' school, reached by a stone staircase. The accommodation provided for the boys is the same as that for the girls. Similar corridors, lavatories, and teachers' rooms are provided on this floor. The infants' school is situated to the left of the main block looking towards the Penarth Railway. In it accommodation is given for 168 infants. There is one large schoolroom with desks for 108 and gallery for 72, and three class-rooms with accommodation for 60 and another for 108. The large schoolroom is divided from the adjoining by means of a sliding partition, and when this is open a room 63 ft. long by 23 ft. is obtained. The main doors are so constructed that they will open either way. The cookery kitchen is situated near the main entrance from Rutland-street. A lavatory is provided for this school, and also scullery. The playgrounds throughout are laid with Hartnell's paving, and covered playgrounds are provided both for the boys' girls', and infants' playgrounds. The caretaker's house is on the opposite side to the infants' school. The sanitary accommodation has been supplied and fixed by Mr. George Jennings, of Lambeth. Fresh air will be admitted to the building at the level of windows and extracted above by means of Messrs. Boyle's air-extractors. The floors situated on this floor and the fittings throughout are of pitch-pine varnished. Messrs. E. Turner & Sons, have been the contractors, and their contract amounted to 11,703*l.* The architect for the building was the late Mr. J. P. Jones, and since his death the surviving partners of the firm (Messrs. Richards & Budgen) have superintended the carrying out of the works.

BATHS, COVENTRY.—The new public baths in Pool Meadow, Coventry, are approaching completion, and will shortly be opened. The result of the competition for plans for the new baths was that Mr. H. T. Burgess, a pupil in the office of Messrs. Spalding & Cross, London, was appointed architect, his set of drawings being awarded the first premium of 100*l.* The contract for the work was secured by Mr. C. G. Hill, and the erection of the building commenced in July 1892. The front block in the centre is three stories high, with a one-story wing on each side, the brick walls being relieved with carved stone dressings in floral designs. The entrance for gentlemen is immediately to the left of the centre and that for the ladies to the right, with the ticket-office between. In the front block are also the ladies' quarters and waiting-rooms for both ladies and gentlemen, approached from vestibules connected with the respective entrances. From the gentlemen's first-class waiting-room access is gained to the gentlemen's private baths, of which there are ten, each provided with a shower apparatus, and to the first-class or exhibition swimming bath, 35 ft. by

90 ft., with a water depth ranging from 3 ft. to 7 ft. The platform around is 4 ft. 6 in. wide, and divides the two sides and at one end are dressing-boxes with half-length doors. Above the dressing-boxes gallery is carried all round the bath for spectators, the gallery being reached by the main staircase at the front block. The roof is supported by upright columns and wooden beams elliptical in shape, and a continuous skylight nearly the whole length of the bath, and the ventilation is worked from the platform. The bath is decorated with white glazed bricks, with tiles introduced in various patterns at intervals. A shower-bath is placed behind the diving-board. The other two swimming-baths—the ladies' and second-class men's—are similar in size, construction and appointments, except that there is no galley and the second-class men's bath has adjoining 100 "soap-hole." There are ladies' first and second class private baths, reached from the vestibule. Ten men's second-class baths, swimming and private—which latter there are twenty—are reached by a lavatory corridor. By this corridor also the laundry and necessary appurtenances are reached. The machinery in this department will be driven by a 4-h.p. steam-engine. The boiler-house, in which are four Cornish boilers in adjoins. A tank for the storage of water for the private baths is placed at the top of the building, available whenever the supply may be temporarily cut off. The foreman in charge of the works is Mr. W. McCarthy, and the clerk of the works Mr. A. Davies.

BOARD SCHOOL, SHEFFIELD.—The newly-erected board school at Firwood, Sheffield, was opened on the 16th inst. by Mr. Benjamin Fletcher, J.P., chairman of the Sheffield School Board. The building will accommodate about 360 boys and girls, and about the same number of infants. The infants' department is situated on the first floor, and consists of schoolroom and three class-rooms, the arrangement of the upper story being somewhat similar to that of the lower. The building was designed by Mr. J. B. Mitchell-Witners was the architect, & Messrs. John Chambers & Sons the builders. A warming apparatus was put in by Messrs. Newton Chambers, & Co.

CONVALESCENT HOME, CLENT, WORCESTERSHIRE.—On the 21st inst. the foundation stone was laid at Clent of the new Clent Convalescent Home, the course of erection of which is in connexion with the Old Clent. The structure is to be of red brick with stone facings, and is Gothic in character. A verandah will front the building. Accommodation is to be provided for thirty patients. The architect for the work is Mr. B. Corser, Birmingham, and the builders Messrs. Guest & Sons.

PARISH ROOM, BARNSTAPLE.—The parish room at St. Mary's, Upper Knowle, was opened on the 16th inst. by the Rev. G. Dunlop, the vicar of the parish of Knowle. The room is intended for Sunday-school, club meetings, concerts, lectures, &c. It is constructed of timber, and has galleries on both sides and porch. The heating is by gas, and exhaust air-pumps (Boyle's). The building is by Fletcher's church stonemason, Mr. Thomas Broadbent, of Tottenham, is the contractor, and the architect Mr. William Paul, of Bristol.

SANITARY AND ENGINEERING NEWS.

DRAINAGE OF HOLBECK UNDERCLIFF, SCARBOROUGH.—On the 15th inst. Colonel John Hasted, R.E., conducted an inquiry on behalf of the Local Government Board respecting an application by the Town Council for permission to borrow the sum of 2,500*l.* for the purposes of the drainage of the Holbeck Undercliff. Mr. Martin Samuelson, R.E., Hull, was the engineer engaged to make a report on the efficient drainage of the whole of the Undercliff, and his summary of estimates was (1) removing earth and draining the Undercliff, 3,177*l.* 13*s.*; (2) sea-wall south of steps, 687*l.* 0*s.* 12*d.*; (3) work to complete the existing stone wall, 103*l.* 7*s.* 6*d.*; (4) two groyne on the foreshore, 1,096*l.* 12*s.* The items amount to 5,140*l.* 18*s.* 0*d.* to which is added 570*l.* 9*s.* 0*d.* for contingencies. The Town Clerk (Mr. J. E. T. Graham) said the Corporation had already obtained the sanction of the Board with respect to items 2 and 3; item 1 was not indispensable, and item 4 had been reduced as to bring it within the sum for borrowing.

CONVICTION OF THE THIRLMERE SCHEME.—Mr. George H. Hill, the Engineer for the Thirlmere scheme, states (according to the *Liverpool Post*) that the whole length of the aqueduct—ninety-six miles—is completed, and some eighty miles have been tested. In a few months it is hoped to bring water into Manchester at the rate of 10,000,000 gals. daily. The aqueduct is made so that it will bring in 50,000,000 gals. daily. In addition, the towns about Manchester have the privilege of using this water.

FOREIGN AND COLONIAL.

FRANCE.—A hospital is to be founded in France, which will bear the name of "Hospice Bui Jacob," after the name of the lady who founded it.—There is talk of inaugurating a statue of Balzac, on the Place du Théâtre Français on the 3rd of March next year.—M. Formigé, well-known architect, has been commissioned

design the pedestal for the monument to Washington and Lafayette, which has been offered to the City of Paris by a committee of Americans, and will be erected on the Place des États Unis. M. Bartholdi is the sculptor.—M. Jacques Hermant is the architect of an establishment just completed near Versailles to receive young children whose mothers have not the means of bringing up. The building has been built with special reference to hygienic conditions, and is to be called the "Pouponnière de Porchefontaine."—The little town of Saint Maur les Fossés, near Paris, has opened an interesting art exhibition.—The works for the new bridge of Puteaux have just been commenced.—M. Jouin, a former pupil of the École Française at Athens, has been commissioned to commence a series of excavations at Clazomenae in Ionia.—At Angers, in the curious old mansion known as the "Maison de Pincé," a grand composition by M. Leneupé is being fixed up, representing the entry of Francis I. into Angers.—A children's convalescent hospital is to be built at St. Genis, near Lyons, at a cost of two million francs.—MM. Bauthain and Godfrey architects at Paris, have gained the first prize for the open competition for the Savings Bank in the town of Flers (Orne); the second prize has been gained by M. Forget, also a Paris architect; and the third by M. Amiot, architect at Flers.—The prize for the open competition for a monumental fountain to be erected in the Place Croix-en-Bourg, in the town of Toul, has been awarded to MM. Bauthain, architect at Paris, and Schnegg, sculptor. The second prize has been awarded to M. Clément, at Paris, and the third to M. Siolly, architect, at Nice.—M. Moriceau, architect, at Ancenis, has been commissioned with the execution of the pedestal of the statue for the poet Joachim, of Belay, and the statue is to be erected in this town.—Very shortly the memory of the painter Maxime will be inaugurated at Bordeaux. It is the work of the sculptor Granet, and is composed of a stele, round which climbs a shrub, the branches of which reach to the bust of the artist. In front of the stele Genius sits on the trunk of a tree, drawing on a slab.—At Vendôme a public fountain is to be erected, on the summit of which is to be placed the bust of Madame Clémence Badaire, a poet of much talent.—The eminent sculptor, Bartholdi, has finished a very large allegorical composition of Switzerland protecting Alsace, and supporting wounded France, whilst Charity presents her with some children. This work is to commemorate the generosity of the Swiss when face to face with the French soldiers during the war of 1870. It is to be erected in Bâle.—A bust of the celebrated oculist David has just been inaugurated at Marseilles. One of the oldest monuments of Normandy, the Abbey of Saint Wandrille, where the Merovingian race became extinct, is shortly to be placed in the market. In the Abbey is the curious chapel St. Saturnin, dating from the eleventh century.—The death, at the age of forty-nine, is announced of M. Antoine Elchinger, architect and overseer of the town of Troyes.—We have heard of the death of M. Gaston Thiers, at Rome. He was a painter, late pupil of the Academy Schools at Lille, and obtained the Prix de Rome in 1889, for his picture of "Jesus Healing the Paralytic."

DENMARK.—A memorial of the late Baron Theophilus Hansen, the celebrated Danish architect, for many years resident in Vienna, has been issued by Messrs. Anton, Scholl, & Co., of that city, entitled "Theophilus Hansen og seine Werke," accompanied by numerous engravings, &c.—The well-known sculptor L. Hasselriis is at work in Rome on the bronze statue of "Denmark" to be erected in Copenhagen in commemoration of the Royal Golden Wedding.—The municipality of Copenhagen have under consideration plans for the building of six new Crown churches in the capital, owing to the development of the latter.—The Copenhagen bourse is being ornamented with windows of stained glass bearing the escutcheons of the principal commercial cities in Europe, from designs by Professor Fenger, Crown architect.—The restoration of several ancient Danish structures is to be taken in hand, including the historical Helligaandskirke in Copenhagen (Church of the Holy Ghost), at a cost of 60,000 kr.; the Storehedinge church, near Stevn, under Professors Petersen, Fenger, and others, supervising, and the old Town Hall in Odense, Island of Funen. This structure was built in about 1450, and served as town hall down to 1882, having been restored in 1795. The style and construction were found to be of an undoubted foreign origin.—Vallø Castle, another historical relic, is also being restored, whilst the excavations of ruins of the Castle of Vordingborg have been continued this summer. The outer walls are being laid bare, and the excavations of the site of the main building are next to be commenced.—In the town of Aalborg, Jutland, the foundations of an ancient Catholic church have been discovered, in which Professor Bergsøe, a well-known antiquarian, has furnished a report.—*Appropos* of ancient Danish churches, the oldest is said to be the village Church, near Veile, in Jutland, in which in 1874 paintings in chalk were discovered in Byzantine style, dating from about 1000. It is of limestone with rounded arches,—

Two important engineering works are at present in progress in Denmark, viz., the construction of the free harbour at Copenhagen, and the draining of the Lammefjord. On the former, work is carried on day and night with some 3,000 hands, and the harbour and works are to be completed in two years. The quay-line will be about 3,000 ft. in length, and have a depth of 32 ft. The walls, quays, &c., are being constructed of Oland stone, from the Baltic island of that name, never hitherto used in Denmark, Portland cement, and granite. The cost of the work referred to above will cost some 10,000,000 kr., and it is anticipated that an equal sum will be required for offices, warehouses, railway lines, electric installations, roads, &c. The second engineering enterprise referred to is the draining of the Lammefjord. The company carrying out the same has now drained 1,120 acres, valued at 808,000 kr. The total assets amount to 1,222,000 kr.

ICELAND.—The new suspension bridge across the river Ölfessaa in Iceland, constructed by English engineers, and the first structure of this kind in the northern island, has proved of such use that the Althing has voted a sum of 75,000 kr. towards the construction of a similar bridge across the river Tjorsaa, in Rangárvallasýssel. A native engineer, Herr Rípmann, has prepared the necessary plans and estimates.

MISCELLANEOUS.

APPOINTMENT.—We hear that Mr. Richard S. Henshaw, Secretary of the Institute of Builders (Incorporated), has been appointed Secretary of the Builders' Accident Insurance, Limited, and the Central Association of Master Builders of London, in succession to his father, the late Mr. J. S. Henshaw.

THE CHINESE TELEGRAPH SYSTEM.—According to a recent report of the United States Minister at Peking, the Chinese land telegraph line has been joined to the Russian system, and messages can be sent to any part of the world from any telegraph station in China. The Chinese system reaches Helampo in the north, where the connexion is made with the Russian lines, Wenchuen in Kirin in the north-east, Suchan in Kasau in the north-west, Aichow in Hainan in the south, Takao in Formosa in the south-east, and Zengyueh close to the Burmah frontier in the south-west. The only province not reached by the telegraph is Hunan, which still remains opposed to all foreign innovations. There are 167 stations, the largest number (34) being in Kuantung, and the smallest (2) in Shenai. Since the connexion with the Russian system has been made, the cable companies have added 15 per cent. to their rates, but messages sent over the Chinese lines are not increased over the former rate of 8s. 4d. per word. The service is rapid and satisfactory, and senders of messages have the right to choose whether the transmission shall be by the cable or land lines.

THE SUBSIDENCE AT KELVIN BRIDGE, GLASGOW.—The situation of the Kelvin Bridge remains somewhat the same, says the *Glasgow Herald*, although the subsidence seems to be slowly going on. It was reported to Mr. Whyte, the Master of Works, that the workmen engaged in the boring operations at the base of the teneament at the south-west corner of the bridge had been successful in penetrating to the old coal workings, a distance of 28 ft. below the surface. Fourteen feet of earth and the like number of feet of rock had to be bored. This disclosed a condition in the old coal workings which seemed to corroborate the theory that has been all along put forward that the pumping operations in connexion with the construction of the railway have caused a subsidence of the ground below the teneament. Although the workings are 3 ft. 8 in. in depth, they were found almost entirely free from water, a few inches only remaining. From this state of matters it is inferred the absence of the water support has caused the workings to fall in. The workmen are now engaged making a way into the workings through the loose heaps of "shivers," and this accomplished, doubtless the cause of the subsidence will be definitely known. With regard to the pillar of the north parapet which first gave way, an entirely different state of matters has been disclosed. The miners have been successful in reaching the old coal workings below, but they have been found to contain 4 ft. of water.

STATE OF THE CITY CHURCHES.—At the Consistory Court of London, held at St. Paul's Cathedral on the 17th inst., before the Chancellor of London, Dr. Tristram, Q.C., Mr. Arnold Statham made an application for a faculty on behalf of the rector and churchwardens of the united parishes of St. Magnus the Martyr, St. Margaret, New Fish-street, and St. Michael, Crooked-lane, to authorise the removal of a large quantity of human remains which, it had been recently discovered, were buried within a short distance of the surface and under the floor of the Church of St. Magnus, and which had been pronounced by Dr. Sedgwick Saunders, Medical Officer of Health for the City of London, to be very offensive and a nuisance injurious to health. Owing to the decay going on beneath the floor of the church, had recently subsided in many places. Dr. Hoffman, her Majesty's Inspector for the Burial Acts Department of the Home Office, had also inspected the church, and agreed that the human remains ought to be removed. An Order in Council was issued on May 16 dealing with the matter on sanitary grounds,

but owing to the intense heat it was undesirable for the workmen to commence just yet. Evidence was given that according to estimates it would cost the parishes some 1,300l. to remove the bodies. In the course of the evidence it was mentioned that Sir Christopher Wren, who designed the church after the great fire of London in 1666, had exercised such foresight as to provide an archway in the tower, so that in case the traffic over old London Bridge increased, a cutting could be made through the tower to admit of the traffic being taken in part through it. It was many years afterwards found necessary to broaden the bridge, and it was then seen that Sir Christopher had anticipated this difficulty, and provided the arch through which a footpath over the bridge was subsequently made to lead, without injury to the fabric. The Chancellor of London granted the faculty prayed for.—*Morning Post.*

AMERICAN RAILWAYS.—The total mileage of railways in the United States at the end of 1892, as we learn from "Poor's Manual" for 1893, was 175,223 miles, which shows an increase during the past year of 4,429 miles, or 2.6 per cent. Full statistics of operations were received by Poor from companies working 170,607 miles, or 97.4 per cent. of the total mileage, and from their data the annexed statement was compiled. The revenue train-mileage, exclusive of elevated roads, was 865,000,000; the passenger mileage, 13,697,000,000; the freight ton-mileage, 84,448,000,000. The gross traffic earnings, in British equivalents, amounted to 247,000,000l.; working expenses, 160,400,000l.; net earnings, 71,600,000l.; other receipts, 23,000,000l.; total available revenue, 94,600,000l. The payments for interest absorbed 47,800,000l., and in dividends 16,600,000l. The ton-mile rate for goods was 0.48d.; the average passenger fare, 1.12d.; being the lowest ever recorded. The receipts from passenger fares per mile were 3.37s; and the average number carried per mile was 3.37s; and the average trainload, 42.29. The total payments of interest and dividends amounted to 3.01 per cent. The rolling stock of the railways of the United States at the close of 1892 comprised 35,754 locomotives, 34,281 passenger carriages, and 1,168,867 freight cars.

ST. MAGNUS THE MARTYR.—In granting a faculty for sanitary improvements (see our "Note" of 14th inst., and a paragraph on this page), Dr. Tristram, Q.C., is reported to have expressed his regret that when this church's income, in part, was dealt with by the Ecclesiastical Commissioners, no provision was made to meet the present contingency: 1,570l. has been set aside for repair of the fabric, but as matters now stand the cost of removing the remains (of from 300 to 400 persons), estimated at about 7,500l., will fall upon the parishioners. In the case of St. Martin, Ludgate, a rate of 1s. in the pound has just been imposed, there being no available fund for defraying the charges, 1,500l., of similar removal. Mr. E. B. Tansan, architect, will supervise the repairs at St. Magnus. Miles Coverdale's body was removed hither from St. Bartholomew's by the Exchange on October 4, 1840. The tower was restored in 1885 by Messrs. Dove Bros., under the directions of Mr. A. Billing. On April 24, 1886, we published Mr. E. H. Sedgwick's measured drawings of the tower, which gained the R.A. First Silver Medal, 1885.

CLOCK, PUBLIC HALL, EARLESTOWN, LANCASHIRE.—A new public hall has just been erected by the Local Board of Newton-in-Makerfield, from the designs of Mr. T. Beesley, architect, Warrington. An eight-days' turret quarter-chime clock has been fixed in the tower. The clock strikes the hours upon a bell of about 24 cwt., and the ding-dong quarters upon two smaller bells, the total weight of the three bells being about one ton. The time is shown upon four external dials, 6 ft. 6 in. each in diameter, which are illuminated by gas at night. The gas is turned on and off by an automatic gas apparatus, according to the length of the day. The necessary work has been done by Messrs. Wm. Potts & Sons, clock manufacturers, of Leeds, from instructions received from Mr. C. E. Brierley, C.E., Surveyor and Clerk to the Board.

ENTERIC FEVER AT WORTHING.—In Worthing enteric fever is maintained in a slumbering form, and it cannot yet be stated whether the diminution is due to the abandonment of the specifically polluted water or to the cessation of the cause of origin. The local authority having finally determined to abandon their existing water-supply, the question has arisen as to the best means of supplying the wants of the public pending the construction of new works. One proposal, which seems to have been strongly pressed, was to resort to a process of sand filtration of the water from the suspected wells. Apparently this proposal is based on the modern experiences as to filtration, notably at Altona; but the conditions do not appear to us to be in any way parallel. A remarkable, although partial, elimination of micro-organisms from the Elbe water was effected at Altona as the result of filtration; but Professor Koch distinctly stated that it was not the sand filtration which effected the result attained. On the contrary, the sand itself signally failed, and it was only when the sand layers were uniformly coated with a layer of river mud and organic matter that the elimination of micro-organisms was attained; and even then Professor Koch admitted

[*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; r.e. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; vd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.			TIMBER (continued).		
Greenheart, B.G.	10/0	10/0	Satin, Porto Rico	0/10	0/10
Teak, E.I., London	10/0	10/0	Wailan, India	0/10	0/10
Sesquial, S. Africa	10/0	10/0			
Ash, Canada	10/0	10/0			
Birch, do.	10/0	10/0			
Elm, do.	10/0	10/0			
Fir, Danstic, &c.	10/0	10/0			
Oak, do.	10/0	10/0			
Pine, Canada	10/0	10/0			
Do, do.	10/0	10/0			
Lath, Danish, fath	10/0	10/0			
St. Petersburg.	10/0	10/0			
Wainsot, Rich.	10/0	10/0			
Do, 2nd & 3rd	10/0	10/0			
Do, 4th & 5th	10/0	10/0			
Do, 6th & 7th	10/0	10/0			
Do, 8th & 9th	10/0	10/0			
Do, 10th & 11th	10/0	10/0			
Do, 12th & 13th	10/0	10/0			
Do, 14th & 15th	10/0	10/0			
Do, 16th & 17th	10/0	10/0			
Do, 18th & 19th	10/0	10/0			
Do, 20th & 21st	10/0	10/0			
Do, 22nd & 23rd	10/0	10/0			
Do, 24th & 25th	10/0	10/0			
Do, 26th & 27th	10/0	10/0			
Do, 28th & 29th	10/0	10/0			
Do, 30th & 31st	10/0	10/0			
Do, 32nd & 33rd	10/0	10/0			
Do, 34th & 35th	10/0	10/0			
Do, 36th & 37th	10/0	10/0			
Do, 38th & 39th	10/0	10/0			
Do, 40th & 41st	10/0	10/0			
Do, 42nd & 43rd	10/0	10/0			
Do, 44th & 45th	10/0	10/0			
Do, 46th & 47th	10/0	10/0			
Do, 48th & 49th	10/0	10/0			
Do, 50th & 51st	10/0	10/0			
Do, 52nd & 53rd	10/0	10/0			
Do, 54th & 55th	10/0	10/0			
Do, 56th & 57th	10/0	10/0			
Do, 58th & 59th	10/0	10/0			
Do, 60th & 61st	10/0	10/0			
Do, 62nd & 63rd	10/0	10/0			
Do, 64th & 65th	10/0	10/0			
Do, 66th & 67th	10/0	10/0			
Do, 68th & 69th	10/0	10/0			
Do, 70th & 71st	10/0	10/0			
Do, 72nd & 73rd	10/0	10/0			
Do, 74th & 75th	10/0	10/0			
Do, 76th & 77th	10/0	10/0			
Do, 78th & 79th	10/0	10/0			
Do, 80th & 81st	10/0	10/0			
Do, 82nd & 83rd	10/0	10/0			
Do, 84th & 85th	10/0	10/0			
Do, 86th & 87th	10/0	10/0			
Do, 88th & 89th	10/0	10/0			
Do, 90th & 91st	10/0	10/0			
Do, 92nd & 93rd	10/0	10/0			
Do, 94th & 95th	10/0	10/0			
Do, 96th & 97th	10/0	10/0			
Do, 98th & 99th	10/0	10/0			
Do, 100th & 101st	10/0	10/0			

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays.]

ABERDEEN.—Accepted for the addition to City Hospital, for the Town Council. Mr. J. East, City Architect, 22, Union-street, Aberdeen. Quantities by Architect.

James Smith, Aberdeen £2,500 0 0
John Blaikie & Sons, Aberdeen 2,500 0 0
James Hannechie & Sons, Aberdeen 2,500 0 0
James Donald & Sons, Aberdeen 2,500 0 0
James Laing & Co., Aberdeen 2,500 0 0
James Abernethy & Co., Aberdeen 2,500 0 0
James Laing & Co., Aberdeen 2,500 0 0

ABERDEEN.—Accepted for the erection of new Salvation Army Citadel, in 1st-street. Mr. James Soutar, architect, 42, Union-street, Aberdeen. Quantities by Architect.

James Soutar, Aberdeen £2,500 0 0
James Hannechie & Sons, Aberdeen 2,500 0 0
James Donald & Sons, Aberdeen 2,500 0 0
James Laing & Co., Aberdeen 2,500 0 0
James Abernethy & Co., Aberdeen 2,500 0 0
James Laing & Co., Aberdeen 2,500 0 0

ABERDEEN.—Accepted for alterations, &c., to Captain Pitt's office, &c., North Pier, for the Harbour Commissioners. Mr. Wm. Smith, Harbour Engineer, 15, Regent Quay, Aberdeen. Quantities by Engineer.

James McLeod, 45, Upperwick-street, Aberdeen £14 14 0
James Hannechie & Sons, Aberdeen 14 14 0
James Donald & Sons, Aberdeen 14 14 0
James Laing & Co., Aberdeen 14 14 0
James Abernethy & Co., Aberdeen 14 14 0
James Laing & Co., Aberdeen 14 14 0

ABERDEEN.—For macadamising Link-street, and granite paving, &c., Belvidere-street, for the Town Council. Mr. Wm. Dyack, Borough Surveyor, Town House, Aberdeen. Quantities by Engineer.

James Soutar, Aberdeen £14 14 0
James Hannechie & Sons, Aberdeen 14 14 0
James Donald & Sons, Aberdeen 14 14 0
James Laing & Co., Aberdeen 14 14 0
James Abernethy & Co., Aberdeen 14 14 0
James Laing & Co., Aberdeen 14 14 0

ABERDEEN.—Accepted for the rebuilding of Belvidere Farm House, Old Meldrum. Mr. James Soutar, architect, 42, Union-street, Aberdeen. Quantities by Architect.

James Soutar, Aberdeen £12 12 0
James Hannechie & Sons, Aberdeen 12 12 0
James Donald & Sons, Aberdeen 12 12 0
James Laing & Co., Aberdeen 12 12 0
James Abernethy & Co., Aberdeen 12 12 0
James Laing & Co., Aberdeen 12 12 0

ABERDEEN.—Accepted for the erection of slaughterhouse, lair, stables, &c., for the Aberdeen and City Industrial Cooperative Society, Limited. Messrs. Haywood & Harrison, architects, 42, Union-street, Aberdeen. Quantities by Architects.

James Soutar, Aberdeen £12 12 0
James Hannechie & Sons, Aberdeen 12 12 0
James Donald & Sons, Aberdeen 12 12 0
James Laing & Co., Aberdeen 12 12 0
James Abernethy & Co., Aberdeen 12 12 0
James Laing & Co., Aberdeen 12 12 0

BILSTON.—Accepted for the erection of school, 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st, 32nd, 33rd, 34th, 35th, 36th, 37th, 38th, 39th, 40th, 41st, 42nd, 43rd, 44th, 45th, 46th, 47th, 48th, 49th, 50th, 51st, 52nd, 53rd, 54th, 55th, 56th, 57th, 58th, 59th, 60th, 61st, 62nd, 63rd, 64th, 65th, 66th, 67th, 68th, 69th, 70th, 71st, 72nd, 73rd, 74th, 75th, 76th, 77th, 78th, 79th, 80th, 81st, 82nd, 83rd, 84th, 85th, 86th, 87th, 88th, 89th, 90th, 91st, 92nd, 93rd, 94th, 95th, 96th, 97th, 98th, 99th, 100th, 101st, 102nd, 103rd, 104th, 105th, 106th, 107th, 108th, 109th, 110th, 111th, 112th, 113th, 114th, 115th, 116th, 117th, 118th, 119th, 120th, 121st, 122nd, 123rd, 124th, 125th, 126th, 127th, 128th, 129th, 130th, 131st, 132nd, 133rd, 134th, 135th, 136th, 137th, 138th, 139th, 140th, 141st, 142nd, 143rd, 144th, 145th, 146th, 147th, 148th, 149th, 150th, 151st, 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WAKEFIELD. For the construction of a main pipe sewer for the Lincoln-street district, North 216, for the Union Road Sanitary Authority. Mr. Frank Massey, C.E., Tetley House, Kirkgate, Wakefield. £466 9 6
Squire Booth £47 19 3
Gifford Bros. £37 19 3
Allie Bros. 365
*Accepted.

WARRINGTON. For forming and paving First-street and part of Hamilton-street, for the Corporation. Mr. T. Longdon, Borough Surveyor, Warrington. £293 0 0
F. T. Dennis £293 0 0
Wm. Heaton £293 0 0

WHITSTABLE (Kent). For the erection of a school building, Offspring-street, for the U.D. School Board. Mr. J. L. Webb, architect, Whitstable. £250 0 0
T. W. Porter £250 0 0
T. Connelius £250 0 0
W. R. Nunnstedt £250 0 0
R. Seager £250 0 0
Amos & Ford, Whitstable (accepted) £250 0 0

WINCHESTER. For the erection of new buildings at Castle-hill, Winchester, for the Southampton County Council. Mr. James Robinson, County Architect and Surveyor, Winchester. £12,350 0 0
Brown, Son & Blom £12,350 0 0
Field & Hill £12,350 0 0
Higgs & Hill £12,350 0 0
Padden & Son £12,350 0 0
J. H. Kingierie £12,350 0 0
H. Carter £12,350 0 0
Stephens, Bastow & Co. (Ld.) £12,350 0 0
*Accepted.

WOLVERHAMPTON. For the erection of new residence and out-house at 1, West, N. Hill, for Mr. Joseph Lawler, architect, Wolverhampton. £2,350 0 0
H. Wilcock & Co. £2,350 0 0
H. Gough £2,350 0 0
Ben. Guest (accepted) £2,350 0 0
[All of Wolverhampton.]

Water and Taps.—We are sorry to correct in error which occurred in our last Teleg. for construction of water works, Tisbury, and last week's Builder, p. 116. The Tender of Mr. Frank A. Brown, for engine-house and reservoir, should have been £112 instead of £102.

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J. I. R. (too small).—A. S. (should have stated amount).—J. B. (editor).—J. D. (too late: next week).—T. M. O'Connor (too small).

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We are compelled to decline pointing out books and giving addresses.

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Letters or communications that are more numerous than can be dealt with, and for other reasons, are not published.

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ILLUSTRATIONS.

The Ancient Cathedrals of Scotland: III., St. Machar's, Aberdeen.—Drawn by Mr. Alexander McGibbon	Double-Page Ink-Photo.
Plan of St. Machar's Cathedral, Aberdeen.—Measured and Drawn by Mr. Alexander McGibbon	Double-Page Photo-Litho.
New House for Tutor, Balliol College, Oxford.—Mr. T. G. Jackson, A.R.A., Architect	Two Single-Page Ink-Photos.
New Church, Huyton.—Mr. W. D. Caröe, M.A., Architect	Single-Page Photo-Litho.
House at Tunbridge Wells.—Messrs. Cox & Cooksey, Architects	Single-Page Photo-Litho.

Blocks in Text.

View from South Aisle, Aberdeen Cathedral	PAGE 174	Oak Cornice, Aberdeen Cathedral	PAGE 176
The South Porch, Aberdeen Cathedral	" 175	Ground Plan, Balliol College	" 177
Tomb, Aberdeen Cathedral	" 176	Plan, Huyton Church	" 177
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Architectural Drawings at Chicago.



THE American architectural drawings are placed in the upper galleries of the Fine Art building, and consist of a somewhat heterogeneous collection of executed work, competition drawings, students' work,

and photographic details. Although the collection contains many examples of good work there can be no doubt that, on the whole, the Americans have missed a great opportunity of showing the architects of all nations what they are doing and what they can do in the way of architectural drawing, for the Exhibition cannot be said to be representative of all that is best in American draughtsmanship.

It is, however, a fact which the Americans themselves acknowledge, that show drawings, as we understand them, are not often prepared, at any rate to such a large extent as in England, and this is but natural in a country where everything is done in such a hurry and under such pressure as in the States. It has even been said that in the hurry of work buildings have been commenced before the drawings have been completed, and that as for Exhibition drawings, the answer would be that a photograph would be taken when the "job was through." This is, of course, extreme, but it may serve to point out in what direction the fault lies. The first thing which naturally impresses itself on one is the absence of some of the latest large works from the Exhibition. Church work is almost entirely absent, and the works mostly *en evidence* are tall business premises treated on a very large scale with somewhat startling colour. Small country houses are plentiful, and illustrate the well-known American school of draughtsmanship which has been introduced of late years into England, and which errs by the introduction of tricks and unnatural effects, but which is always bright and never overladen or "worked-up" as in some of the older styles of draughtsmanship. There is practically no student's work, as we understand the term, that is to say, no sketches or measured work. The reasons for this are not far to

seek, in that there is nothing old or interesting enough to sketch or measure in the States. This fact is also emphasised by American students going to the École des Beaux-Arts at Paris, or studying in their own architectural schools, which are founded on it, and we know that outdoor sketching and the measurement of old buildings are not a part of that system.

There are, however, in the collection several *projets* executed from the École and from private ateliers in Paris; these studies show, as usual, the unsuitability of the treatment to the subject in hand, although from the point of view of composition they may, and doubtless do, answer their purpose.

Mr. L. J. Millet, himself an architect-student of the École and Lecturer on Architecture at the Art Institute of Chicago, has had the arrangement of the drawings, and has endeavoured to keep those by the same architects in groups, a method which, curiously enough, was adopted simultaneously this year at the Royal Academy, with good results.

Perspective and geometrical shaded drawings seem fairly evenly divided, the perspectives being always employed, as is natural, in the country houses and smaller works, and in some of the bigger works in which colour is the medium employed. One finds extreme difficulty in generalising anything which is American; whether in architecture, painting, or sculpture there seems no standard of general excellence; for instance, you find some drawings executed with a care and freshness which is positively delightful, and on the next screen you are horrified to find a drawing which is characteristic of the very beginner. For this reason it will be best to make a few notes of the more important contributions.

Mr. Richard M. Hunt's only contribution is a drawing, 12 ft. high by 3 ft. wide, of a part of the house for Mr. W. K. Vanderbilt, delicately modelled in the Early French Renaissance style, and which consists of three stories and a roof modelled after the Château de Blois, the niches containing statuary, while the angle turrets are elaborately carved.

Messrs. Adler & Sullivan, of Chicago, send pen drawings of the Union Trust Building at St. Louis, in which the principles advocated by these architects are well exemplified. It

is a fifteen-story building on a corner site. Light is obtained on the long side in a way that is becoming characteristic in America, and which has been adopted at the new Women's Temple at Chicago, viz., by recessing the central portion of the façade and thus forming a court, with one side left open to the street, which is, of course, a great improvement on an internal court. The two lower stories are thrown into a basement with semi-circular upper windows and predominating horizontal lines, thus binding the lower part of the structure well together; the next ten stories are grouped together between piers connected at the top with semi-circular arches, the windows being recessed between these and treated plainly. Above this comes a strong horizontal band, and the next two stories are enclosed under columns supporting a massive projecting cornice, the top story being lighted from the roof. The principle of the design seems right, and it certainly emphasises the architect's idea that unity is the first great principle of composition, and that every building, whether high or low, should be enclosed within one main idea and should not be a succession of floors piled one above the another without reference to the scheme as a whole. The detail of the great semi-circular entrance doorway reminds one somewhat of the intricate sculpture work at the Golden Gate of the Horticultural Building by the same architect. The design is rendered in a slightly-finished pen and ink perspective.

Near this is a drawing by Mr. Bruce Price, which, as hinted at previously, is a good example of what *not* to do. It is an elevation in water colour of a design for a high building. Mr. Price has taken the Tower of St. Mark's, at Venice, with the marble loggia at the base included, and by the introduction of windows to each story he has turned it into a modern American "skyscraper." It is true he is able to get thirty-two stories into his building, but where is the American inventiveness about which we hear so much? Any Yankee notion would be better than this, and it is difficult to understand how such a design could have found a place in the Exhibition.

In the corner bay hard by are three large framed drawings by Messrs. Crain Wentworth, & Goodhue, of Boston, which are interesting in many ways. They are

drawn to a large size, each being 6 ft. by 4 ft., and are designs for three churches of some pretensions, of which, as already remarked, there are few in the Exhibition. One of these is executed in monochrome, while two are in pen and ink, after the English method in many respects, but in which a new device, called "spattering" in the States, has been introduced in the following way:—When a large plain wall-surface occurs in a drawing, which it is desired to cover so as to give it an appearance of texture of stonework, or plaster, or what not, the rest of the drawing is covered up with the exception of the part to receive the tone, and a brush full of ink is then drawn along a comb, sprinkling the drawing to any desired shade, and really giving it a very soft and agreeable effect. It produces somewhat the same effect as light washes in conjunction with pen work. These churches are more English in composition and treatment than any in the collection, and remind one somewhat of the late John Sedding's work; for example, we notice the same large west window, with its three buttressed divisions, the square towers enriched at top with small spirelets of copper, and the turrets, as at Trinity Church, Sloane-square. Whether either of the architects are English, we are unable to say, if not, the influence of the *Builder* plates has found its way to Boston, Mass.

Alongside, Messrs. Lamb & Rich send some large frames. One is a bromide enlargement of a pencil drawing, which comes out very softly, although the lines are somewhat distorted from being enlarged. This is certainly a novel way of getting a large architectural drawing, but the effect is a somewhat blurred one.

In the next bay is a large water-colour drawing of the New York State Building at the Fair, by Messrs. McKim, Mead, & White. The design is founded very literally on that of the Villa Medici at Rome. The colouring is somewhat overdone, and the blue of the sky not cleverly handled.

No. 3,238 is a four-story building, executed in monochrome, by Mr. Hughson Hawley, who has executed a number of drawings in the collection, but whose standard varies very much. Close at hand is a small drawing by Messrs. Rossiter & Wright, of New York. It is executed in pencil on grey paper, and is a design for a small country house to be executed in grey stone. The only colouring is that put on the red tile roofs, and brick chimney-stacks which start directly from the stone at the eaves level. The drawing is very quietly treated, and seems to us the right principle to bear in mind for an architectural drawing, especially in view of the tricky innovations of the present day. Almost next to this, and by the same architects, is a perspective and small plan of the Clark Memorial Library on Long Island, treated in pencil on grey toned paper with slight colour indications on walls; the building is small, containing only a library with alcove, reading-room and librarian's room, and with museum over large library, and with open timber roof. A couple of trees crisply put complete the drawing, which is one of the most satisfactory of its kind in the show.

Photographs are admitted, and we wonder how long it will be before that much abused institution, the Royal Academy, will allow this form of representation on the walls of the Architectural Room, a method of portrayal which is at once the most truthful and the most satisfactory of any kind. That of the Madison-square Tower at New York, designed after the famous Giralda at Seville, by Messrs. McKim, Mead, & White, of New York, is very satisfactory, as showing the grouping with the surrounding buildings.

Here follow several large Ecole designs by students, in which the plans occupy most of the space, and scores of which might be seen in any French exhibition. A very well thought-out set are, however, sent by Mr. T. F. Turner, a pupil of M. Paul Blondel.

Perhaps the most satisfactory piece of pen work is the drawing of the new City Hall for Boston, Mass., by Mr. E. W. Wheelwright, architect, and which is drawn by Mr. Chas. D. Maginnis. The design is apparently founded on Bramante's Cancelleria Palace at Rome; the building being large, and the drawing of it comparatively small, the architectural features have had to be very judiciously put in so as not to overcrowd the drawing, and Mr. Maginnis has had to adopt a sort of architectural shorthand. There is not a ruled line on the drawing, all the straight cornices, naturally occurring in a Renaissance work of this kind, being put in by hand; the shadow of the loggia on the top story is effectively put in, while no cross-hatching appears at all, the difference in tone being obtained by thickness and closeness of line. The shadows from cornices are treated as being produced by sunlight high in the heavens, and almost in front, and are sharply expressed, reminding one somewhat of the method of Mr. Gerald Horsley. The figures and statuary are equally well done. It is such exquisite pieces of work as this which it would be impossible to improve upon, which make it very difficult to generalise on the collection as a whole.

Mr. Wheelwright also sends his design for a Primary School-house at Boston, also executed by Mr. Maginnis. It is a classical composition, two stories in height, with projecting top cornice, the lower story rusticated with small square windows, and large doorway at each end; and the upper floor with large semi-circular windows, grouped towards the centre.

In the Exhibition are several competition drawings executed for the Cathedral of St. John, at New York. We note that by Mr. W. H. Wood, a fly-away pen-and-ink drawing in which lights and shades are contrasted together in an alarming way. No. 3,390 is another set, in line, by Mr. R. W. Gibson, an Englishman settled in New York, and which is in every way superior to the last-named. The Americans do not, for the most part, seem capable of designing anything well in the Gothic style, and especially a building of this magnitude, and it seems certain that anything we are to expect from America must come from the new conditions of life which exist there, and which involve new problems for the architect, and not from anything which has gone before, and which of necessity does not commend itself to the American architect.

Messrs. Carrère and Hastings send several large drawings of their magnificent Hotel Ponce de Léon at St. Augustine, Florida. This hotel is constructed externally of white plaster with red brick dressings to windows and red Italian tile roofs. The grouping is symmetrical, with towers and open loggia, emphasising points on the plan, and a bright effect is obtained by the introduction of palm trees and green shrubs and by the bright blue Florida sky. The size of this water-colour is about 12 ft. by 6 ft., and we are glad to note that a ground plan almost the same size has been sent and placed over so that the *rationale* of the design can be followed. In many instances, however, no plan appears with the elevations or perspectives, which is, we suppose, a concession to the vulgar idea of making a pretty picture for the public to gaze at without reference to its real merits as a design.

Large drawings of several high buildings appear. In these, water-colour has naturally been the medium selected by the draughtsman in view of the large amount of space to be covered. Amongst others, Messrs. Shepley, Rutan, & Coolidge, of Boston and Chicago, and who succeeded the late Mr. H. H. Richardson in his practice, send a large water-colour about 11 ft. high by 6 ft. wide, showing the Ames Building at Boston, a structure thirteen stories high. A Romanesque feeling runs through the features, as was to be expected, but we cannot help thinking that the principle adopted by Messrs. Adler &

Sullivan is the only way to design these high buildings, and that the placing of stories one above the other, and marked with horizontal bands, and with no unity of expression, almost looks wrong.

What we may term architectural impressionism is somewhat largely illustrated. It is difficult to draw the line between this and mere sketches, perhaps; but Mr. Arthur Rotch sends a clever little pencil sketch of a country house in perspective in the Italian Renaissance style, with large overhanging eaves, the walls of yellow colour and with dark tiled roof. It is a very good example of a water-colour, with general masses indicated. The California State Building in the World's Fair, by Mr. Page Brown, which, in itself, is a very interesting structure, is shown by a hideous scene-painter's drawing in bright green and red. The design itself is made up of materials from the old Spanish missions in California, and is one of the most pleasing of the State buildings.

One of the most careful pen drawings is that of a design by Mr. H. J. Hardenbergh for an Art Club, in a very small type of François 1st style, in which some strong sunlight effects are introduced in keeping with the best American style. Messrs. Holabird & Roche, Architects of the Live Stock Pavilion at the Fair, send some quietly coloured drawings of their work, that of the First Sheridan Tower being specially characteristic of American work. It represents a square tower with solid circular projecting angles and low segmental doorway at base, the upper story being projected on corbels to come near the edge of angle projections and treated with upper colonnade and pyramidal roof with rounded edges, the whole design rather reminding one of Richardson's work.

Messrs. Holabird & Roche also send a good water colour perspective of their new "Old Colony Building" at Chicago, now being erected in a central part of the town. It is seventeen stories in height, in grey stone with circular corbelled bays at the angles, plain square headed windows and boldly designed cornice, the upper stories, enclosed as it were, to form a frieze, and forming one of the most satisfactory of the high buildings at Chicago.

No. 3,338 shows a bright sketch in pen and ink of a country house, such as we are accustomed to see in the American illustrated journals, the idea in the architect's mind being apparently to make as much roof and as little wall as possible. It is sketchily put in with sloping walls, and placed on a hillock. No information is given, and it is possibly a fancy sketch to catch a client.

Some large drawings hard by, in the French manner of a "design for a suburban residence," by an Ecole student, show about as little knowledge of the requirements as is possible to imagine. If the title had been altered to "A Prince's Country Mansion," the case would have been very different.

Messrs. Le Brun & Son, of New York exhibit a neatly-executed water-colour of a new ten-story office block—the Metropolitan Building in the Madison-square—at New York. It is built of white stone, and unity is attained by enclosing several stories under one arch.

Messrs. Peabody & Stearns send a sheet of office sketches, in colour, of buildings erected by them, many of which are very effective, but considering that Messrs. Peabody & Stearns have done some of the best domestic work recently erected in the States, many of which are at Newport, R.I., these sketches do not do justice to them, and it is a pity they were unable to send more drawings. This is, however, only a further illustration of the fact that even the foremost architects in the States do not give time to the preparation of show drawings.

An unexecuted house by Messrs. Andrews, Jacques, & Rantoul, is shown in a bold sepia drawing which is quite Elizabethan in character, with mullioned windows and diapered walls, and with terraced front, making altogether a composition which must have been

studied by one having an acquaintance with English precedent, which is very rare indeed in the collection.

In the enlargement of the Cambridge City Hall (Mass.), by Messrs. Longfellow, Alden, & Harlow, the late Mr. Richardson's influence is clearly seen. It is to be executed in rough-faced granite, with steep pitched roof and dormers, with massive central tower, and with open upper stages as campanile. Another firm of architects who send works of interest are Messrs. Gilbert & Taylor, whose design for a frame-built house, with granite basement, is shown in a very cleverly-executed pen and ink drawing by Mr. Gilbert, who also shows an exquisitely-drawn little sketch of a stone church at the foot of a hill at St. Paul, Minn., in which the grouping is cleverly handled.

The armoury for the 13th Regiment at Brooklyn, by Mr. R. L. Daus, is a very appropriate piece of work, and is being executed at the present time. It is shown by a good water-colour drawing, and is of unpolished red granite in a castellated manner, with huge semi-circular entrance arch, flanked by circular towers, the rest of the design kept dignified and severe, the upper part of the towers corbelled over castellated. Mr. Daus has studied at the Paris École, but in this design he has shown that he can, like Richardson, forget a good deal of what is taught there. In conclusion, we should say that the Exhibition, although not by any means strong, is, perhaps, a fair one, but that it contains extremes of good and bad work, both in regard to draughtsmanship and design, while water-colour and pen and ink seem to hold even sway. Church work must be very badly represented, because we know that some very good work on a small scale has been done under the influence of the late Mr. Richardson. No designs for stained glass, which take up so much valuable space in our Royal Academy, are present in the collection, and colour decoration is not represented at all in regard to studies for exterior or interior work. But taking into account the apathy of the American architects to making show drawings, we should say that the collection is a fairly representative one of the state of American architecture at the present time, and compares very favourably with our own collection at Chicago.

In approaching the German collection of drawings a great difference is at once noticeable. They are hung in the bays of one of the naves on the ground floor. The drawings consist mostly of large coloured views very carefully prepared and shaded, and are principally of public buildings and churches. Amongst the former is the German design for the Parliament House and Court of Justice at Tokio, Japan, executed in a coarse German classic style by Messrs. Ende & Böckmann of Berlin, who exhibit the plans; the composition consists of a lower story treated as a basement with rustications, with two stories over, enclosed under an order of Corinthian columns. Surmounting the whole composition is a copper-covered dome with lantern, the space beneath which on plan forms a central "salle des pas perdus" from which, by means of wide galleries on either side the Upper and Lower Houses are reached. It is a pity that the Japanese have not sufficient patriotism to execute something in their own style instead of this heavy and coarse design. The same architects exhibit their design for the Court House at Tokio, a two storied building in red brick and stone and with steep roof.

A project for a town hall at Leipzig, by Herr H. Licht, is also shown by plans, elevations and sections in monochrome. It consists of two stories in the wall and two in the roof, whose vertical height is considerably greater than the wall which supports it. The lower floor consists of a series of semi-circular arches in red brick and stone, while square-headed windows come over and then some really well designed ornamental dormers. The tower

is placed in the centre, making a very characteristic design and tinted in Indian ink with good feeling. Plans and plaster models are shown of the Imperial Office of Insurance and the Imperial Office of Patents at Berlin. Both are in the accepted governmental Classic style and both equally bad, but the idea of illustration by models is a good one.

Two competition designs for the William I. monument are exhibited. One is shown by a large rough pen and ink drawing in which groups of statuary are introduced wherever possible, and is representative of the worst phase of modern German pseudo-classic architecture; the other design is at the further end of the collection, and is executed in black chalk to a large scale. It is 20 ft. by 12 ft., and shows the late Emperor on horseback on a pedestal surrounded by a semi-circular colonnade of coupled columns designed in the worst possible taste and executed in a style which would be despised anywhere out of Germany.

As a change, three elevations of a small villa are shown, in which as many towers and spirelets are worked in as possible; the details somewhat of French Renaissance, except the towers, which have the usual top-heavy German appearance.

Herr G. Hanberrisser sends his design for the New Rathaus, at Wiesbaden, and a plan is given. It is executed in the later German Renaissance, the central feature flanked with towers having conical roofs and spire, and forming a pleasing and characteristic building.

Professor L. Levy shows coloured elevations, plans and sections of his synagogue at Kaiserlautern, in the Moorish style, with bulbous pyramids and interior decoration of Byzantine treatment.

A church and a synagogue at Munich, by Herr A. Schmidt, follow; the one is an attempt at Gothic in the wiry modern German style, and the synagogue is some way after Romanesque, in red brick and stone. In the next bay is the large plaster model of the Memorial Church to the Emperor William, at Berlin. It is placed at the meeting of six streets, and has an important enough aspect. It consists of a nave and short transept and apsidal east end, and two apsidal projections on each side of the western tower and spire. It is vaulted internally. The plaster model is very well executed, but the Gothic is of that unfeeling description so displeasing to English eyes. Plans, elevations, and sections of a colour treatment surround the model.

After some very poorly-designed Gothic churches in colour are shown, we notice some public buildings, such as the Government building at Münster, in red brick and stone with mullioned windows and high-pitched roof.

The Law-Court house at Cologne is an important structure in the German Domestic style, with well designed circular angle towers with steep spires shown by a fine water-colour drawing, about 12 ft. long. It is certainly one of the best designs in the collection, though eminently German.

Then follow a "Reception Building" at Düsseldorf, a Court House at Bochum, the Morgue at Berlin, all of which in drawing and design are as bad as they could be, while a very satisfactory water-colour drawing shows the Dom Hotel at Cologne, with the Cathedral alongside.

Herr Max Spitta sends a large model in plaster of his "Gaudenkirche" in Berlin. In plan it consists of a Latin Cross, with narrow ambulatories on each side of nave, which go round semi-octagonal apse, and having sloping lean-to roof externally. It is in the modern German Romanesque, and, therefore, poor in detail, and spiky and wiry in general effect.

It is a curious thing, but one cannot help remarking the extraordinary amount of German church work shown in comparison with domestic work. Whether there has been no attempt to illustrate this latter we know not, but the fact remains that domestic work is

scarcely shown at all, while very poor church work is here in quantities.

The series winds up with a chalk drawing of the Cathedral of Metz effectively rendered, but which does not show old and new work. Also the reconstruction of Bremen Cathedral and other churches, to which the same remarks apply as to style.

In the centre of the gallery and opposite the drawings stands a large model in a coarse Classic style of the German Parliament House in Berlin by Herr Paul Wallot, architect. If the collection is representative, we should say that German architecture is in a very poor way, especially in domestic and church work. In the public buildings which do not pretend to be Classic, but which are in the Renaissance of Northern Germany, and which have a large amount of Dutch feeling in them, with mullioned windows and high-pitched dormer roofs, good feeling is introduced, and with success, as at the Law Court House at Cologne. Water colour is nearly always the medium employed, necessitated, in great part we should say, by the large size of the drawings.

The French architectural drawings are shown in the east long gallery, in the centre of which are the French architectural reproduction in sculptures. The collection of drawings is a disappointing one. Besides the smallness of the collection, what strikes one principally is that many have been on view before, and some even as long ago as the 1889 Exhibition at Paris.

All the drawings are large, and are executed in water-colour or monochrome, no pen and ink work being on view.

The collection consists principally of public buildings, but some domestic work is shown which is almost as bad as it can be. Whatever the École may do for composition and design in regard to great public buildings, it certainly has not grasped the right principles in regard to domestic work. The attempt of the design in each case seems to be to produce a miniature palace, to introduce as many finials and features of all kinds as possible, and by so doing to lose all that simplicity and repose which is seen in the best English and American work.

Among the more noticeable of the exhibits is the Hôtel de Ville at Suresnes, consisting of a series of six drawings photographed from the original drawings, and with views of the buildings as actually executed, making a very complete collection.

Close by on a revolving screen is a collection of plans, elevations, sections of historic French churches, consisting of photographs from measured drawings. These are sent presumably by the Bureau des Monuments Historiques, and form a valuable *résumé* of the work of that body.

Then follow a few large drawings of Decorative treatment, and an important series of twelve drawings, by M. A. Marcel, of a *Restauration* of the Château of Tonguedoc in Brittany, very unlike English work in every particular, being tinted in monochrome and shaded.

The Bourse at Amsterdam occupies the whole of the next screen, with eight huge strainers in light ink and tinted. It is executed in a very good type of Dutch Renaissance, by M. J. Cordonnier, and bears the date 1892. Internally iron is used in the same manner as in the late Paris Exhibition, with terra-cotta filling in behind, which shows that the Paris Exhibition has exercised a certain amount of influence—in France, at least—and which forces on us the thought, intensified by the erection of the great buildings at Chicago, that perhaps the older countries will develop a new style first. The set is accompanied by a workmanlike detail section to a large scale.

M. T. Guadet sends his new Hôtel des Postes, being erected opposite the Louvre. The design is explained by four large plans, one elevation, and two sections, which are executed in line and tinted, the architecture partaking of the somewhat cold Paris official phase.

A scheme for the decoration of a theatre,

by M. Louis Bigaux, follows, in which the architecture and decoration are worked well together.

M. Depertthes sends a large perspective of his fine scheme for refacing Milan Cathedral, which was exhibited at the Paris Exhibition; and we are inclined to think that M. Ballu's Palais de Justice at Bucharest was also exhibited there. M. Ballu also exhibits his Chili Building erected at the Paris Exhibition, and a series of small drawings of *Restaurations*.

As will be gathered from the above, in which the principal drawings are enumerated, the French collection is a very poor one, and it would probably have been better not to have exhibited at all than to have sent a collection in which the foremost architects are not represented, and which is not representative of the state of French architecture at the present time.

English architectural drawings have been intentionally omitted from this notice.

NOTES.

THE detailed verbal report of the French Congress of Architects, which is being continued week by week in the columns of *L'Architecture*, gives us in the last number of that journal a full account of a discussion on the question of architectural competitions, some points in which are of interest as showing the view taken by French architects of certain questions which have been frequently discussed in this country in regard to competitions. One of these is in regard to the position of the assessor or the jury in determining the final result of the competition. The position which in England is occupied by the assessor is in France apparently occupied by a jury of architectural experts; a much better system, as the result is not then subject to the idiosyncrasies of taste of a single person in regard to plan or design. At the French Congress it appears that M. Guadet, in his report on the subject of competitions, concluded that the report of the jury "est définitif, sans appel et exécutoire." Whereupon arose a question as to whether the jury were to be, according to this verdict, the sole and final arbitrators in a competition. M. Guadet's answer was in exactly the same spirit which we have more than once indicated as the correct one in regard to the position of the assessor in a competition. The jury, said M. Guadet in his reply, can never say to the "administrateurs" (the "building committee," in our language), "give up your rights entirely into our hands." But he adds, "quand le jury, composé des hommes compétents, aura dit 'Voilà le meilleur projet, il est bon, il doit vous donner des garanties,' il proclame la loi que ce projet est susceptible d'une bonne exécution et d'un bon résultat, et je pense qu'une administration aura bien du mal à ne pas déférer à son avis." This is exactly the view which we have always laid down as to the position of the assessor in competitions. He is to consider the plans and advise as to the best one, and if the Committee is wise it will probably adopt his decision. If it refuses to do so, as M. Guadet goes on to say, "le jury ne pourra rien"; it has done its duty, and if in spite of this the commission is given to a competitor whom the jury has not found worthy of recommendation, "cela fera un petit scandale" which cannot be helped. We may draw attention to the fact that the "jury" system in competitions seems to be an accepted fact in France. Why cannot we have it in England? It is a far better system than that of assessor, because several heads are better than one, and we are delivered from the necessity of leaving the matter to be settled according to the possibly fixed or prejudiced though perfectly honest ideas of an individual. Another point touched upon in the discussion reported in the last number of *L'Architecture* is the practice of "merging the premium in the

commission" (as we say in England) in the case of the selected competitor. This idea was rejected with scorn by the French architects—as M. Achille Hermant put it, amid general concurrence, the competition design is an "avant projet," which has to be made over again for the execution of the building; and it is that (the "avant projet") and that only, which is paid for by the premium offered for the successful competitor.

AT the final public sitting of the Select Committee on Railway Rates last week, Sir Courtenay Boyle plainly intimated that the Board of Trade had been quite misled by the railway companies with regard to the revised rates of January last. It appears that the permission to dispense with some of the forms of notice of alterations in the rates was given by the Board after a conference held in November between the railway companies and the Board of Trade. Sir Courtenay Boyle informed the Select Committee that the Board expected that certain rates would be raised, but they never supposed that the actual rates which were below the maximum would be generally raised to the maximum. "If the Board had known that," he continued, "they would not have given the railway companies facilities for dispensing with the usual form of notice. They would have used their power in that respect to influence the companies not to charge the maximum rates." This is a very important statement, proving as it does that a great deal of the trouble caused by the introduction of the January rates might have been avoided. It is clear that the Board of Trade either misunderstood the companies, or were misled by them as to their intentions. The Board knew, in the first place, that the basis of the new rates would be the new statutory powers; and they knew also that it was contemplated that there should be some recoupment on the part of the railway companies for compulsory reductions; but they evidently left the conference under the impression that comparatively few advances would be found necessary, certainly without the least anticipation of the sweeping changes which were actually made. The companies had every opportunity of comparing the old and new rates before the publication of the latter, and could hardly have deceived themselves as to the effect of the change; yet at this conference they assured the Board that "the traders would find themselves very much as they were before." So far from this being the case, it is well known that the January rates placed nearly every industry in the country in a far worse position than it had ever occupied before with regard to railway charges; and, as Sir Courtenay Boyle stated in the course of his evidence, there was no indication that the raising of the rates was merely temporary. Another point brought out before the Select Committee was the view taken by the Board as to maximum rates, which differs considerably from that expressed by Sir Henry Oakley in his evidence. In fixing the maximum rates their idea was, according to Sir Courtenay Boyle, to leave a margin for possible contingencies, such as an increase in the price of labour, of coal, or of iron, which would prevent the railway companies from maintaining the actual rate.

ON a high wooded cliff rising from the Ash and Minster marshes, locally called "polders," and with the Stour, or rather Wantsum, flowing past its base, stands Richborough Castle, once garrisoned by the Second Legion surnamed "Augusta," the reputed spot of St. Augustine's first interview with Æthelberht, Son of the Ash-tree, and one of many neglected national monuments. A fund, however, has been opened to buy the ruins, with the $\frac{5}{8}$ acres, under cultivation, which they enclose, for it is stated 900l. Of the three remaining walls, rectangular on plan, the north, 500 ft. long, and 12 ft.

thick, is the best preserved. Its external height varies from 20 ft. to 30 ft.; the outer facing consists of regular courses of squared grit and stone, unequally sized, separated by layers of curved-edged and flat tiles; the angles of its postern-gate being varied with yellow and red tiles; the inner facing was mainly of flint. The west wall has a round bastion at each end with a square tower and the decuman or principal, gate in its front. The south and north walls have similar square towers. The square towers, projecting 8 ft., are solid up to $7\frac{1}{2}$ ft. from the ground, hollow in the middle, and joined again to the curtain walls at top. The hollow portions have holes in their sides as though for the insertion of timber-staging. At the decuman gate is a pavement measuring $5\frac{1}{2}$ ft. deep, 24 ft. 11 in. long, and 21 ft. 1 in. broad, affording a base wide enough for the marching of ten men abreast.* The wall foundations are made of two rows of boulders resting on the natural soil, a compact pit-sand. Mr. Roach Smith describes the walls themselves as built of layers of boulders, sand-stone, ochre-stone, and chalk blocks cemented with mortar composed of lime, grit, sea-shells, and pounded tile: there are also bits of oolite and travertine (deposited by running water) and of petrified *teredo navalis*. In laying out the railway (1846) they cut through the walls, of flint and tile, of a Roman building at the foot of the hill, and found several pits, filled with dark rich mould and fragments of stags' horns, bones of boars, sheep, and goats, broken pottery, and the like. The amphitheatre, placed on an eminence—its centre distant southwards 460 yds. from the castrum—is oval in shape, measuring 200 ft. by 166 ft. When explored by Smith and Fairholt, it was found to have a wall, built of flint and chalk, with three entrances, and from 2 ft. to 3 ft. deeper within than without, encompassing a platform about 10 ft. wide. At the door angles were tiles 10 in. square laid in double rows. About fifty years ago Mr. Rolfe, of Sandwich, made a large collection of British, Roman, and Saxon coins, together with Roman articles, tools, and implements, and specimens of wall-paintings discovered in this ancient stronghold (so like Lyme in many respects), on what Juvenal, Lucan, and Ausonius call the Rutupine shore.

AT the last meeting of the Archæologische Gesellschaft at Berlin (the report of which appears in the *Berliner Philologische Wochenchrift* for Aug. 12), Herr Adler read a paper in which he maintained that the views recently enunciated by Herr O. Richter, on the date of the Pantheon, were by no means the "incontestable facts" that their promulgators imagined them to be. Some of Herr Richter's statements as to the actual structure he disputes; some, he says, are stale news, and much more evidence will be, he thinks, required before the old orthodox view can be relinquished—i.e., the view once held that Hadrian did nothing beyond restoring the building, and in this restoration was entirely faithful to the plan conceived and first executed by Agrippa. We have already given our reasons for believing that the new view of the history of the building is supported by too much evidence to be very doubtful; but, of course, no archaeological view of any kind can be promulgated which will not find a German critic to contradict it.

AT the same meeting, Dr. Otto Kern discussed the difficult question of the cult of the Kabiri, so far as light is thrown on it by the recent excavations both at Samothrace, and more especially at the sanctuary near Thebes. This is not the place to enter on the profoundly interesting mythological problems that arise in this

* The pavement has been robbed for building-stone. We take its dimensions from the late C. Roach Smith's work, illustrated by F. W. Fairholt, upon the "Antiquities of Richborough, Reculver, and Lyme" (1850).

connexion, but Dr. Otto Kern made one practical suggestion which will, we sincerely hope, not be thrown away. He urged the desirability of supplementing the work at Thebes by excavating the site of the little chapel to Hagios Nikolaos, which stands within the ancient precinct of Demeter Kabiria. Till this is done we have half the story of this mysterious cult as yet untold.

IN January last, the sites and buildings of Nos. 25-7, Cornhill, covering an area of 1,950 sq. ft., and No. 24, Cornhill, covering 550 sq. ft., were sold at auction for 90,000*l.* and 23,500*l.* respectively. The four houses formed a block standing between the two entrances into Change-alley; their recent demolition, together with that of the square block in their rear, has quite altered the aspect of the alley, to which they had a frontage of 100 ft. Immediately opposite the central block, stand, in Change-alley, some premises erected in 1874 from the designs of Mr. R. Norman Shaw, R.A., to serve as the private portion of Messrs. Martin & Co.'s banking-house—lately registered under the title of "Martin's Bank, Limited,"—and occupying, as we are authoritatively informed, the site of "Garraway's" Coffee House, established there more than two hundred years ago. "Garraway's," with "Robins's" and "Jonathan's," was consumed by the fire of March 24, 1748. Martin's bank is one of the oldest of its kind in London, and under its sign of "The Grasshopper," claims, we believe, to represent the business house in Lombard-street of Thomas Gresham. A Martin appears amongst the goldsmiths *temp.* Elizabeth; there is a tradition that Matthew Shore, the goldsmith, had kept his shop on the present site of the bank's public office. In 1677, Charles Duncombe and Richard Kent traded as goldsmiths at "The Grasshopper," between "The Plough" (now Glyn's), and "The Unicorn," which was the house of Alderman Backwell, who laid out Change-alley in 1668-9. Charles Duncombe, whose niece and heiress Mary, became ancestress of the Lords Feversham, bought ("at near 90,000*l.*," Evelyn says) Helmsley, county York, since Duncombe-park, of George Villiers, second Duke of Buckingham. Duncombe-house, designed by Vanbrugh, was destroyed by fire on January 11, 1879, and is now being rebuilt for Lord Feversham, after the designs of Mr. Young, of London, architect: for further particulars see our "General Building News," of July 15 last. The freehold of Nos. 11-12, Cornhill, built 1854, by Holland & Hannen, was bought last January for about 165,000*l.* Messrs. W. Cubitt & Co. are re-building Nos. 24-7, Cornhill, and the central block of Change-alley for occupation by, we are told, the Commercial Union Assurance Company, whose premises in Change-alley were erected, on the site of "Sam's" Coffee House, by Messrs. Davies & Emanuel, architects. "The Swan" and "Jonathan's" formed the east and west sides of the central block; thus "Baker's," which retains its old shop-front, is the last survivor of the old houses in Change-alley.

IT is very remarkable that, with the evil effects of the strike of last year still apparent, a majority of the miners in Durham should be in favour of entering upon another similar conflict. Yet were it not for the fact that a majority of two-thirds is necessary before a strike can be proclaimed, the Durham colliers would soon again be found swelling the ranks of the unemployed. For, in spite of the rapidly increasing suffering and starvation among the strikers in the Midlands and the memories of the acute distress in their own county, the voting gave a slight majority in favour of striking for an increase in wages. Reports from Wales are rather conflicting, the mining centres being in a most excited state; while disturbances are becoming unpleasantly frequent

in the Midlands also. Unfortunately no decided move has yet been made in the interests of peace, and it is but too well known that a considerable time usually elapses before a settlement can be arrived at after negotiations have been set on foot. The coal owners, as a body, seem to be in no hurry to make any proposals,—although this week repeat their offer to submit the whole question to arbitration. It remains to be seen whether the men will show any disposition to abandon the uncompromising attitude they took up at the outset, and accept the proposal for arbitration which they formerly rejected. It was hardly to be expected that the Miners' Federation would permit a partial resumption of work, and the decision at the conference of last week was that all their members should remain out. The worst part of this unfortunate affair is the hardship inflicted upon thousands of non-combatants, who are made to feel the effects of the dispute quite as severely as those with whom it originated; and for their sakes especially it is to be hoped that a settlement will soon be arrived at.

LETTER FROM PARIS.

FRANCE is in the middle of elections at present, and the "scrutin" of August 20 has been unfavourable to one of the great architects—possibly the only one—who has a seat in Parliament, viz., M. Emile Trélat, Deputy of the Fifth Arrondissement, who finds himself, according to the established phrase, "en ballottage," and whose election will shortly be the subject of a second voting. The political adversaries of M. Trélat (who is a very moderate Republican) reproach him with having received large fees as architect to the Department, and being consequently a "salaried official" of the Government. Without discussing this rather singular theory, we may observe that in the former House M. Trélat took a very good position, and that in an assembly in which questions of hygiene and of public safety have to be discussed, it is very desirable to have the advice of a professional man who can speak with authority on such subjects.

As already mentioned, the scheme for the new railway from Moulineux to the Invalides had been approved by the Government, and will constitute the first portion of the metropolitan railway system so long demanded and so long delayed. The line, a double one, will start from the existing station at the Champ de Mars, in an open cutting. It will cross the abutments of the Iena and Invalides bridges, and terminate at the angle of the Rue Constantine, opposite the Ministry of Foreign Affairs. The "Gare des Invalides," which will adjoin the Champs Elysées, with which it will communicate also by a bridge over the Seine, will have a monumental façade 98 metres in length with two side elevations of 46 metres. The central portion will be reserved for the service of the suburbs. The new station will occupy about two-thirds of the front square of the Esplanade des Invalides, between the Quai d'Orsay and the Rue de l'Université. It will be bounded by two courts, one on the right for main line arrivals, the other on the left for their departure. The works will be commenced very shortly.

The absence of the company of the Comédie Française in London, and subsequently on a tour in the French provinces, has been made an opportunity for furnishing up the "Maison de Molière," which it must be confessed was looking very shabby. Numerous modifications have been made in the arrangement of the interior, especially in the auditorium, which now presents a pretty and attractive appearance. Among the alterations, the ancient lustre, which dates from 1817, has been replaced by a large electric chandelier of 2,320 candle power, and which is so placed as not to hide any part of the stage from the gallery spectators. The interior of the house has been repainted throughout, regilt, and newly upholstered in very good taste, and all necessary measures have been taken to bring the arrangement of the house up to the latest police regulations in regard to the safety of the actors and the public. The work has been carried out under the superintendence of M. Guadet.

The summer vacation has also been utilised in other directions as an opportunity for pushing on works of construction. At the Ecole de Droit, at present closed to students, M. Lheureux has been pushing on vigorously the work on the new

buildings, which are to include several lecture-theatres, professors' rooms, and the Dean's apartments. At the centre of these buildings, which will communicate by long galleries with the existing entrance in the Place du Panthéon, will be a court roofed with glass in which will be formed a reading-room in connexion with the libraries. The completion of the work will probably occupy three years, and will cost 3,500,000 francs.

In reference to this subject we may mention that the demolitions necessary to make way for the new buildings have brought to light various Gothic arches once forming part of the chapel and cloister of the Jacobins, so celebrated in the sixteenth century, and of which other vestiges remain in Rue Victor Cousin. It is to be hoped that these relics will not be destroyed, and will find what seems to be their proper place in the garden of the Carnavalet Museum. Let us hope also that the conservative zeal of M. Cousin, the curator of that museum, will lead him to demand the little ancient gate of the Conciergerie, which will have to be removed in the course of enlarging the Palais de Justice. This historic gateway opened on the principal façade, at the right of the large stone staircase near the "Cour du Mai." It is this doorway, low and narrow, with its ancient wrought-iron work and solid bolts, which was introduced in the scene in the last act of M. Sardou's "Thermidor." It has a real historic interest, for during the Reign of Terror it opened for Marie Antoinette, the Girondins, Charlotte Corday, Danton, Robespierre, and many other victims of the Tribunal, the road to the scaffold.

The sculpture galleries of the Louvre have been enriched with various remarkable works. In the Puget gallery have been placed three fine bronze statues which formerly ornamented the Pont au Change, those of Louis XIV. as a child, Louis XIII., and Anne of Austria, works in the best style of Simon Guillain, who died in 1698. In the Coustou gallery has been placed the "Poësie Lyrique," a marble statue executed in 1752 by Adam, the sculptor of the celebrated central group in the "Bassin de Neptune" at Versailles. In the Houdon Gallery has been placed the "L'Amour et l'Amitié," a marble group by Pigalle, including a figure of M^{me}. de Pompadour; the "Nympe Amalthée," a pretty marble figure by Julien; and a fine bas-relief by Bernier, found ten years ago, by M. Courajod, in the building yard at the Abbaye St. Denis. This latter work, executed in 1770, represents "Louis XV. Protégeant la Peinture et la Sculpture." The Diana gallery has received a "Faun Endormi," a marble work by Bouchardon, of the date of 1732, and which for thirty years was hidden away in the cellars of the Louvre; a fine bas-relief, "Sacrifice à Apollon," from Mysia, and another Greek bas-relief in marble representing Silenus in a car surrounded by satyrs. In the Renaissance department of the Louvre there is also to be seen a new exhibit, a splendid gilt suit of armour of the sixteenth century, left to the Louvre by the late M^{me}. Henri.

We may mention also that amateurs of artistic curiosities may now see collected together at the Cluny Museum, in the "Salle des Emaux," the objects purchased by the State from the Spitzer collection, and which will hereafter be distributed in their proper departments in the Cluny Museum or at the Louvre.

A few days ago, at the École des Beaux-Arts, the jury gave judgment on the competition for the subject, "Le Salle de Pas Perdus d'un Palais de Justice." Out of sixty-six competing designs, the jury awarded First Medals to M^m. Guadet (pupil of his father), Blot (pupil of M. Laloux), and Alleguy (pupil of M. Pascal). Second Medals were awarded to M^m. Dehandt, Afiner, Verhuist, and Lemaresquier.

The death is announced, at the age of sixty-six, of a painter completely forgotten in the present day, but whose name was formerly connected with some political scandals which were much talked of at the time, though they did not succeed in giving to the painter the artistic renown which he was vainly ambitious for. We refer to Ernest Louis Piccio, better known under his pseudonym "Picq," who made his *début* in the Salon in 1864 by two portraits which attracted some attention. He sent to the Salon of 1869 a scene of the St. Bartholomew massacre, of some energy of design, and a picture representing the death of the *Député Baudin* on the barricades at the moment of the *Coup d'État*. The Imperial Government forbade the exhibition of this picture, photographic reproductions of which, however, were sold right and left, and which found admission into the Salon of the

preceding year. Two years later the artist, desirous to draw attention to himself by a fresh scandal, presented to the Salon of 1872 a picture in which French soldiers were firing, in the Park of La Muette, on the defenders of the Commune and a crowd of terrified women, old men, and children. This time it was the Government of the Republic which forbade the exhibition of the picture, which had little artistic merit. This was the last picture offered for exhibition at the Salon by Ernest Piccio "dit Picq," who after that fell into obscurity and poverty.

A learned archaeologist of Vannes (Morbihan), M. Riellaud, has been assassinated under very mysterious circumstances. He was an old gentleman of seventy-two, living alone in the midst of his books and manuscripts. He was the author of various able works on ancient Celtic monuments.

We hear also of the death of a distinguished archaeologist, M. Jules Ilavet, curator of the National Library and member of the Committee of "Travaux Historiques."

THE CAMBRIAN ARCHEOLOGICAL ASSOCIATION AT OSWESTRY.*

THE second day's excursion, on Wednesday, August 23, was an unusually long one and could not have possibly been undertaken had not the weather been propitious. Luckily, however, the rain clouds disappeared, and neither mackintosh, umbrella, nor overcoat were needed during the remainder of the week.

The route taken was through Llynclwys, Llangedwyn, and Llanrhiadr-y-n-Mochnant, to Pennant Melangell, twenty-two miles west of Oswestry, no stops being made on the outward journey. Here, as elsewhere, the nature of the geological formation gives the key to the character of the scenery of the country passed through; first the mountain limestone bluffs walling in the valleys with perpendicular cliffs and giving an almost horizontal skyline; next the silurian hills, gracefully rounded by glacial action and now covered with velvety green meadows; and, lastly, as the great chain of the Berwyn mountains are approached the jagged slate rocks rise in lofty peaks. The industries of the district too have left their impress on the face of nature in the shape of great yawning limestone quarries, lead mines, tunnelled into the sides of the mountains with little mole-hills of debris in front of the entrance to each adit, and the rubbish from the slate quarries disfiguring the landscape most of all.

The tedium of the long drive was beguiled by listening to the weird Celtic legends which have gathered round the ancient remains on Llan-y-Mynech Hill, five miles south of Oswestry. It is at this point that the line of Offa's Dyke cuts the boundary of Shropshire and Montgomeryshire. In the face of the hill is the gloomy cave, or Ogo as it is called in Welsh, formerly a mine worked by the Romans, where, according to the legend, the owner of the castle, believed to be now submerged in the lake below the hill, had an interview with the Devil.

The party reached Pennant Melangell about mid-day. The church of St. Monacella, or Melangell, is in the most romantic and secluded position imaginable, right in the heart of the Berwyns, at the far end of a valley, through which there is no road practicable for wheeled vehicles beyond the church, recalling to mind the situation chosen by the Cistercian monks for Llanthony Abbey, in Monmouthshire, the inaccessibility of which became at last so intolerable that they felt compelled to remove the site of their monastic establishment to Gloucester.

Lake Vyrnwy, from which Liverpool derives its water supply, fills a very similar valley a few miles to the southward. Pennant Melangell Church is close to the source of the Afon Tanat, a small tributary of the River Vyrnwy, and is surrounded by mountains rising to a height of over 2,000 ft. above sea level. The scenery is quite as fine as that in the most frequented parts of the Western Highlands of Scotland, and there is no doubt that if Pennant Melangell were more easily of approach it would become a favourite tourist resort. In summer the chief obstacle is the great distance from a railway station, but in winter the choice lies between the "break-neck" road at a high level and the "drowning" road at a low level. To the Celtic hermit-saint the chief attraction of such a place lay in the effectual barriers which Nature had set up between it and the outside world. No "desert in the ocean" or mountain solitude was so difficult of access as to deter him from building his cell there, and if we

would trace the footsteps of the early Irish missionaries we must follow them to the sea-girt islands of the Atlantic or the remote fastnesses of the Apennines. It is not surprising, then, to find that the church at Pennant is dedicated to St. Melangell, the daughter of an Irish monarch. The legend, as related in Pennant's "Tour in Wales," tells how the princess having vowed celibacy, escaped from Ireland to avoid being married to a nobleman of her father's court, and took refuge at this place, where she lived for fifteen years without seeing the face of man, until one day a hare which was being hunted by Brochwel Yscythrog, Prince of Powys, took refuge under her robe, and there boldly faced the hounds who retired howling. When the huntsman tried to blow his horn it stuck to his lips. Brochwel, when he heard her story, gave to God and her a parcel of land, whereon to build a church, to be a sanctuary to all who fled there. This picturesque legend is represented on a carved oak frieze on the front of the gallery at the west end of Pennant Melangell Church. A large number of sculptured fragments are built into the walls of the church and stone porch over the lych-gate, which are conjectured to have formed portions of the shrine of the saint. Amongst the fragments are four beautiful Norman capitals of small size, ornamented with foliage, a slab with a semicircular hollow scooped out of the bottom, and a triangular slab with crockets, also ornamented with graceful scrolls of foliage in low relief, but whether of as early date as the capitals it is not easy to determine off-hand. Whatever these fragments may eventually turn out to be, they are well worthy of careful examination. The ground plan of the church consists of a nave with western tower and chancel a few inches narrower than the nave and separated from it by a carved oak screen. There is a small rectangular building at the east end with no doorway between it and the church, which may possibly have contained the saint's shrine, or tomb. It is still called Cell-y-Bedd, or the Cell of the Grave.

The south door and a window on the north side of the nave are Norman, and the rest of the windows square headed and debased in style. The font is plain and of Norman date. There are two recumbent effigies at the west end of the nave near the south door, which were in the churchyard when Pennant wrote his "Tour in Wales." One of the most interesting objects in the church is a wooden candelabrum almost all the different parts of which are made entirely on the lathe. The turned mouldings are very delicate and of the same kind as those on balusters, spinning wheels, and chains of the sixteenth, seventeenth, and eighteenth centuries. There is a turned post in the centre intended to be suspended vertically from the top. Near the bottom four turned spokes project horizontally at right angles to each other, to support four of the candlesockets, also turned. Just below these are four similar spokes, each placed half-way between those above so that the eight candlesockets are at the angles of an octagon, measuring 4 ft. across. Under this again is a flat hoop-wheel with four turned spokes. The flat part of the hoop is the only part that is not made on a lathe. On the outside of the hoop are painted the names of the churchwardens and the date 1733. This remarkable example of eighteenth-century art workmanship is lying uncared for inside the tower, and will probably be destroyed if not better looked after.

The Church of Pennant Melangell is surrounded by five magnificent yew trees. The Rev. Elias Owen pointed out a place in the churchyard formerly used as a cockpit for the parishioners, and presided over by the parson. A hollow place under a projecting ledge of rock on the opposite side of the valley to the southward, and about a quarter of a mile from the church, is called Gwely Melangell, or St. Monacella's bed, the latter name being cut on the rock at a late date.

After an *al fresco* luncheon, the members started on the return journey at 2 p.m., and on arriving at Llangynnog (a little over two miles east of Pennant Melangell), commenced a walk of five miles over the mountains in a northerly direction to Pistyll Rhaiadr. Immediately over Llangynnog is Craig Rhiwarth, which rises to a height of over 1,500 ft. above sea level. The whole summit of the mountain is the site of a prehistoric settlement of vast size. The steep cliffs above the Llangynnog slate quarries form a sufficiently strong defence on the south side without any artificial military works, but on the north, where the ground slopes down gently towards the ridge connecting Craig Rhiwarth with the mountains behind, it was necessary to erect a long stone rampart running almost due east and west, so as to cut off the

higher part entirely. The hut circles, now all that remain of the dwellings of the former inhabitants, are situated a little below the summit on the south side overlooking the valley of the Tanat. They were thus protected from the north winds by the ridge behind.

A walk of three miles northward from the top of Craig Rhiwarth brought the party over the ridge and down the other side into the valley of the Afon Disgynfa, the stream at the bottom of which flows over a precipice 240 ft. in height forming the most lofty waterfall in Wales, known as Pistyll Rhaiadr, and separating Denbighshire from Montgomeryshire. At the western and higher end of this valley the stream divides into two branches, and on a small eminence in the fork between the streams is a sepulchral circle of upright stones, approached by an avenue. Both the circle and the avenue are very perfect, but the small size of the stones is disappointing. The view obtained from thence, looking down the valley towards the clump of fir-trees above the waterfall, is extremely beautiful, and remarkable in this respect, that the valley of the Afon Disgynfa, instead of sloping away gradually, right down to the bottom of the larger valley, into which it runs, cuts it at a level of 240 ft. above the bottom, and the stream tumbles over a sheer precipice at the junction.

Near the foot of Pistyll Rhaiadr the carriages were ready to convey the members to Llanrhiadr-y-n-Mochnant (four miles south-east), where dinner awaited them at the "Wynnstay Arms," at 8 p.m. It was nearly 9 p.m. before they were sufficiently refreshed to undertake the return journey of fourteen miles back to Oswestry, which was not reached until about 11 p.m.

The excursion on Thursday, August 24th, differed from the others in being by rail instead of by road. Leaving Oswestry by an early train, Llangollen was reached shortly after ten o'clock. The town itself is about as ugly and uninteresting as it is possible for a modern villa-begirt tourist resort to be, the only redeeming feature being the fourteenth-century bridge over the Dee, with four pointed arches of different spans, the width of which has been doubled to suit the requirements of modern times. Llangollen, like a base gem in a beautiful setting, is surrounded by lovely scenery. It is shut in on the north by the grand limestone cliffs of the Eglwysyg Rocks, in front of which rises a conical outlier of Silurian slate, crowned by Castell Dinas Brân. There are three lines of communication, running nearly parallel to each other, along the bottom of the valley of the Dee, namely the road, the railway, and the Ellesmere canal. A boat was ready to convey the party along the silent highway of the latter to Valle Crucis Abbey, a mile and half to the north of the railway station. Here Mr. H. Harold Hughes, A.R.I.B.A., acted as guide, pointing out all the salient features of the architecture of the building. The Cistercian Abbey of Valle Crucis was an offshoot of the less-known Abbey of Strata Marcella, and was founded in A.D. 1200 by Madoc ap Gryffydd Maelor, Prince of Powys. The ground plan of the church is cruciform, with aisles on each side of the nave, and four chapels on the east side of the transepts. The extreme length of the church inside is 165 ft., and the width across the transepts 98 ft. The central tower has fallen, and the upper part of the walls of the nave, more especially on the north side, but otherwise the building is tolerably perfect.

The oldest parts are at the east end, the gable of the chancel being Late Transitional Norman in style, and so extremely ugly that it is difficult to believe the unsightly plaster continued upwards, so as to form a frame round the upper pair of lancet windows, can be part of the original design. From an architectural point of view the parts of the building most deserving of study are the east-gable of the nave, the thickness of the walls of which does much to enhance the beauty of the windows pierced through them; the finely-carved Early English doorway leading from the nave into the cloister on the south side; and the vaulted roof of the chapter house springing from four columns.

The monks' dormitory is immediately over the chapter house, and in the floor of the former, just above the vaulting of the latter, several thirteenth and fourteenth sepulchral slabs have recently been discovered, some inscribed with Lombardic capitals, and others ornamented with scrolls of foliage. It would be very desirable to have these removed at once, or covered over again, otherwise the trampling of the feet of visitors will soon obliterate every trace of the carving, which is now in unusually good preservation.

* Concluded from p. 170, ante.

An excellent plan of Valle Crucis Abbey is to be found in a MS. volume on "Cistercian Architecture," by J. C. Buckler, in the British Museum (Add. MS. No. 27,764, vol. 3, p. 73). Since this plan was made, some excavations on the north side of the nave have revealed the existence of buttresses and other details not shown by Buckler.

In the course of these recent explorations, a sepulchral slab was discovered, bearing a cross with expanded ends to the arms of rather unusual design. The sculpture of the capitals from which the vaulting of the presbytery once sprang (still *in situ*), and the capitals of the nave arcades (preserved, with other fragments, amongst the ruins) present some local peculiarities of style which should not escape notice. Since the explorations made at Strata Florida and Strata Marcella Abbey, the fact has been revealed that there was a distinct Welsh variety of sculpture in stone in the twelfth and thirteenth centuries. A remarkable feature at Valle Crucis, which must not be overlooked, is the Lombardic inscription above the rose window in the west gable, giving the name of Adam Abbas, the builder.

Leaving the Abbey, a short walk across the fields brought the party to Elise's Pillar, a monument standing on the summit of an artificial mound a quarter of a mile north-west of the Abbey. Here Mr. J. Romilly Allen delivered a short descriptive address on the subject to the archaeologists who clustered round the base of the ancient pillar. Referring to the name of the monument, he said that the earliest mention of it was in the "Brut-y-Tywyssogion," where it was stated that the Abbey of Valle Crucis was founded in A.D. 1200 "near the Old Cross in Vale." The name "Elise's Pillar" could be traced to the time when the reading of the inscription, published in Gough's edition of Camden's "Britannia," was made by Edward Llwyd, of the Ashmolean Museum at Oxford. In this reading the name Elise was given as the erector of the stone. Mr. Allen stated that when Pennant wrote his "Tour in Wales," the pillar was lying prostrate, and pointed out the modern inscription, recording its restoration by T. Lloyd, of Trevor Hall, in 1779. The more ancient inscription was in Hiberno-Saxon minuscules, and almost entirely obliterated, but the small incised cross at the commencement could be clearly seen. If Edward Llwyd's reading was to be trusted it recorded the facts that the monument was set up by Concenn, son of Cattel, son of Brochmail, son of Guoillauc, to the memory of his great-grandfather Elise; and that Conmarch wrote the inscription at the request of his King Concenn. The relationship of the various persons mentioned corresponded with those given in the Welsh genealogies preserved in a fourteenth-century MS. in the British Museum (Harl. 3,859, fol. 195A). The names of Cadell, Cyngen, and Elise occurred also in the "Brut-y-Tywyssogion," between the years A.D. 808 and 854. The question was whether Edward Llwyd was acquainted with the old Welsh genealogies and made his reading of the inscription to suit them. If his reading was to be relied on it was one of the longest and most important early Christian inscriptions in Great Britain, and it was lamentable to think that it had been allowed to perish by exposure to the weather.

With regard to the form of the monument Mr. Allen observed that its peculiarity consisted in being approximately round at the bottom and square at the top, the semi-circular lines of intersections of the flat and curved surfaces being emphasised with a roll moulding, and just below this a horizontal cable-moulding encircling the top of the round part. This type of monument was apparently of Merician origin, as specimens occurred with greatest frequency in Staffordshire, although there were examples as far north as Cumberland. Plot, in his "History of Staffordshire," called them Danish pillars, and some persons had even thought they might be Roman. There could, however, be little doubt from comparing Elise's Pillar with the Gosforth Cross (a cast of which might be seen in the South Kensington Museum) that the former was not a pillar at all, but the shaft of a cross broken off. This was further borne out by the former name of Elise's Pillar, viz., the "Old Cross in Vale." The field in which it is situated is still called "Llwyn-y-groes" (the Grove of the Cross), and the whole glen "Pant-y-groes" (the Vale of the Cross, latinised as Valle Crucis). Only one other monument of the same type as Elise's Pillar was known to be inscribed, namely, that in the churchyard at Beckermest St. Bridget's, in Cumberland. Unfortunately, it too was obliterated, so that it threw no light on its age. The figure sculpture on the Gosforth Cross showed a mixture of

Irish and Scandinavian art, which would indicate a late date, possibly in the ninth or tenth century. The archaeological and historical evidence therefore (assuming Edward Llwyd's reading of the inscription to be correct) tended to show that Elise's Pillar was erected in the ninth century. It was the only monument of the kind in Wales, and its presence within the borders of the Principality was an indication that at this period Merician influence was strong in the district. The tumulus on which the cross stands had been opened at the beginning of the century, and the remains of a skeleton found buried in a coffin constructed of rude slabs of stone. A piece of a silver coin had been discovered with the body. This had been kept, but the skull had been gilded in order to preserve it, and then again deposited with its kindred bones (see "Arch. Camb.," new series, vol. ii., p. 302).

At the conclusion of Mr. Allen's lecture an animated discussion took place, in which the Venerable Archdeacon Thomas, Mr. Stephen Williams, F.S.A., and Mr. Edward Owen joined. Archdeacon Thomas was of opinion that whatever Saxon influence there may have been at a later period, the first Christian settlement was a Celtic one, as was indicated by the dedications of the neighbouring churches. Mr. Stephen Williams showed that Elise's Pillar could not possibly be Roman, because the cross section at the bottom was not a true circle, but a rectangle with the corners rounded. If it had been Roman it would have been turned in a lathe.

Some of the members ascended the hill, 970 ft. high, on the top of which the medieval fortress of Castell Dinas Brân is situated, a mile north-west of Llangollen; but those who had thought discretion the better part of valour and remained below missed very little, as the ruins are entirely devoid of interest, and have been sadly vulgarised by the erection of a camera-obscura in their midst. Plas Newydd, a small cottage formerly the residence of the "Ladies of Llangollen," and the parish church dedicated to St. Collen, were also visited. Neither of these objects, however, repaid the time spent on their examination.

After luncheon at the Hand Hotel, Llangollen, the members departed by train for Ruabon to inspect the church there. The chief objects which attracted attention were two monumental effigies, placed in a most inaccessible position underneath modern tombs within a railing on the north side of the churchyard; portion of a beautiful sepulchral slab of the thirteenth century covered with graceful foliage, now used as the headstone of a modern grave; a splendid altar tomb with two recumbent effigies of John ap Elis Eytton of Watlay, who fought at Bosworth in 1485, and of Elizabeth Calfley his wife, inside the church; a fifteenth-century fresco on the south wall of the nave representing the Works of Mercy, and some good modern stained glass windows. After spending an hour or so in the examination of the church the party returned to Oswestry, where there was just time enough left before dinner to take a hasty glance at the site of the castle at the north end of the town. All that now remains of this once important border fortress is a mound laid out with walks, on the summit of which are some shapeless blocks of masonry.

The route chosen for the last day's excursion on Friday, August 25, was almost circular, through Llansilin to Llangedwyn (10 miles south-west of Oswestry), and returning through Llanyblodwell and Lynclys. Before starting, a couple of hours were profitably employed in seeing the parish church of St. Oswald, St. Oswald's well, and High Lea. At the church Mr. W. H. Spaul, F.R.I.B.A., read an exhaustive paper on the history and architecture of the building, which was listened to with great attention. Oswestry Church has a fine interior, covering a large square area, and a massive tower on the exterior. Portions of the structure date as far back as Norman times, but most of the old work which remains is late, and the whole has received the impress of the genius of the late Mr. G. E. Street, when restored by him in 1872-5. The church plate was displayed for the inspection of the archaeologists, and the splendid silver-gilt and jewelled chalice, made from Mr. Street's design and presented by the Hon. Mrs. Bulkeley Owen, was almost as much admired as the more ancient specimens of the silversmith's art, dating from 1575 onwards. A pathetic interest attaches to the graves of the French prisoners taken during the Napoleonic wars, placed all together in one corner of the peaceful churchyard. One epitaph, which will serve as a sample of the rest, reads as follows:—

"Ci git D. J. J. Du Vive, Capt. Adj. aux Etats Major Généraux, prisonnier de guerre sur parole, né à Pau Dept. des Basses Pyrénées le 26 juillet 1772 et décédé à Oswestry le 20 juillet 1813."

Further traces of these prisoners were seen afterwards, when visiting High Lea, the residence of Mr. W. Fletcher Rogers, in the shape of a large number of exquisitely-finished models of engines of war, made to beguile their time during the weary years of captivity spent at Oswestry.

At High Lea also Mr. Fletcher Rogers showed two sculptured plaques of alabaster, found concealed under the floor of one of the rooms at Plas-yn-Pentre, in the Vale of Llangollen. The subject of one is Christ crowned with thorns, surrounded by the emblems of the Passion, and the other represents some saint, with the nimbus round the head, kneeling in front of a stream issuing from a pile of buildings at the upper left-hand corner. The saint is clad in armour, over which he wears ecclesiastical vestments, and leads a dragon by a cord held in the right hand, and holds a bag, or some other object, in the left. On one side of the stream is a crucified figure on a cross, and a second dragon is swimming in the water below. The whole scene is most curious. Perhaps some hagiologist may be able to recognise the legend it illustrates from the description just given. The subject does not appear to be Scriptural.

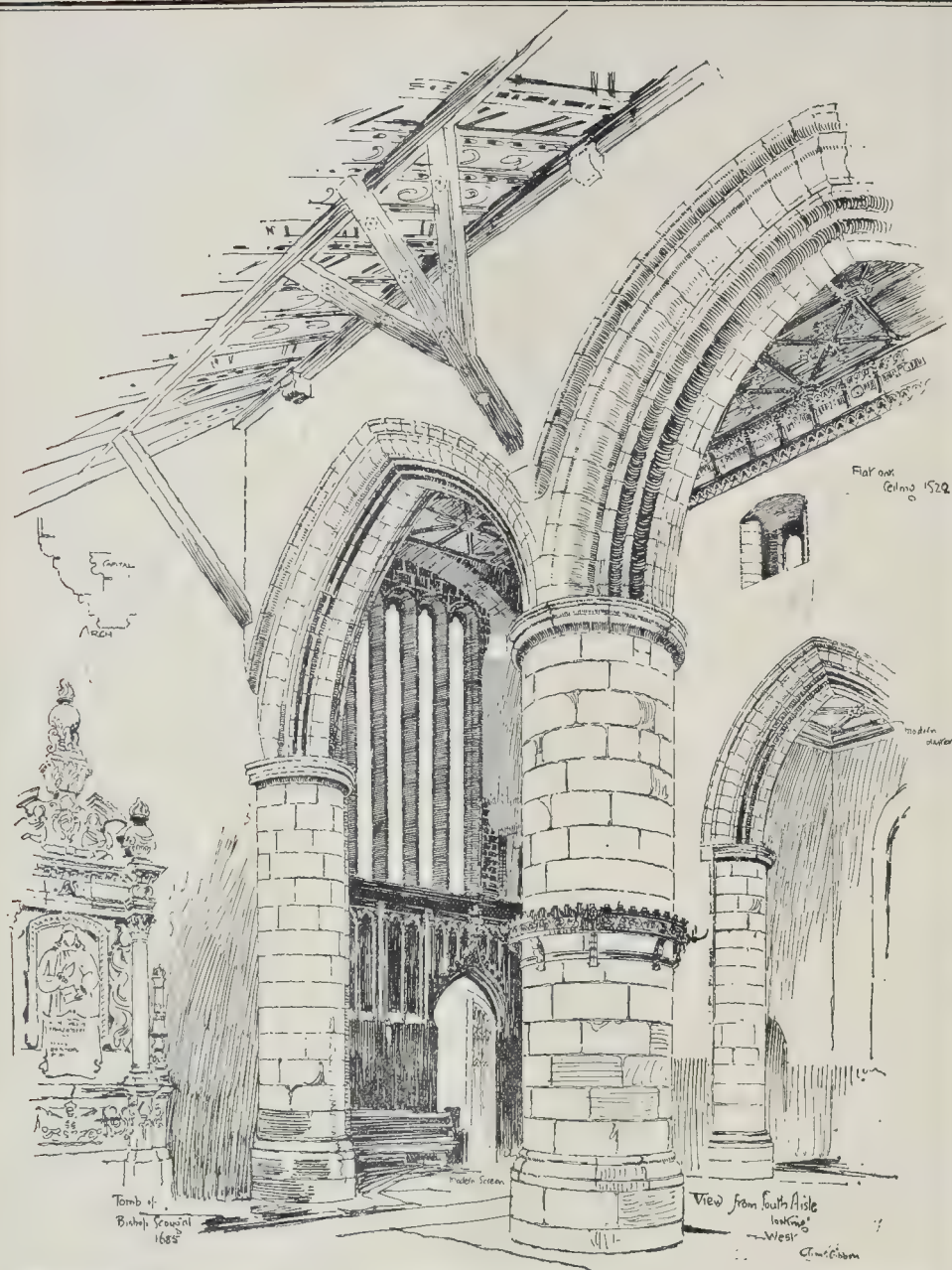
St. Oswald's Well is situated on the rising ground behind the town of Oswestry on the west side. It is covered with a masonry structure and the water issues from a sculptured head. Its only interest lies in its dedication to the saintly King of Northumbria.

The carriages left the Wynnstay Arms Hotel, at Oswestry, for Llangedwyn at 11 a.m. The first stop was at Brognyntyn, a mile and a half north-west of the town. Here the members were courteously received by the Right Hon. Lord Harlech and after examining the carved oak chimney-pieces, dated 1617, in the hall, several pictures, antiquities and ancient MSS., were conducted by the owner through the grounds to Castell Brognyntyn, a circular earthwork defended by a single rampart, situated a little over a quarter of a mile north-west of the house.

Rejoining the carriages, the journey was continued as far as Forest Farmhouse, two miles and a-half west of Oswestry, at which point Offa's Dyke cuts the road. Here, under the guidance of Mr. A. C. Nicholson, the hon. local secretary, the members were conducted on foot up the hill to the northward to afford them an opportunity of seeing an almost perfect section of the Dyke, which owes its preservation to the fact that the surrounding land has only recently been enclosed. This portion of the Dyke might with advantage be scheduled under the Ancient Monuments Act before it shares the fate of the remaining portions, and is obliterated by the plough. A mile beyond Forest the road crosses the border of Wales, and a drive of two and a-half miles further brought the party to Llansilin, where luncheon was provided at the Cross Foxes Hotel. The members then started to inspect the church, under the guidance of Mr. Arthur Baker, F.R.I.B.A., the architect by whom it has been "restored" (using that word in its best sense, if it has one). Llansilin was, on the whole, much the most interesting church seen during the meeting. The Rev. Elias Owen pointed out two remarkable features in the church, (1) that one end of the communion-table was carved whilst the other was plain, showing that its original position was with the long axis pointing east and west in the middle of the chancel; and (2) that on the plaster on the north wall of the nave outside could be traced a horizontal line coloured red, a relic of the times when the game of fives was played in the churchyard. There are many other things worthy of attention, amongst which may be mentioned the capitals of the nave arcade, carved with the same kind of foliage as at Valle Crucis Abbey; an octagonal poor's box cut out of a solid oak post, dated 1664; a beautiful eighteenth-century wrought-iron grille in front of a mural tablet in the north aisle; the open timber roofs; the south door of the nave riddled with Cromwellian bullets; and last, but not least, the fine yew-trees in the churchyard.

Half way between Llansilin and Llangedwyn the carriages came to a standstill for about a quarter of an hour, whilst the party examined the moated mound at Sycarth. It is an earthwork of early type, probably a little before the Norman Conquest, consisting of a lofty mound and a base court, all surrounded by a ditch. Owen Glyndwr is traditionally believed to have had a residence here, and a description of the house and its

Continued on page 178.



Illustrations.

ST. MACHAR'S CATHEDRAL, ABERDEEN.*

THE patron saint of this cathedral was a disciple of Columba, who at the close of the sixth century erected a church on a bend of the river Don. According to tradition his master had enjoined the settlement where a river made the figure of

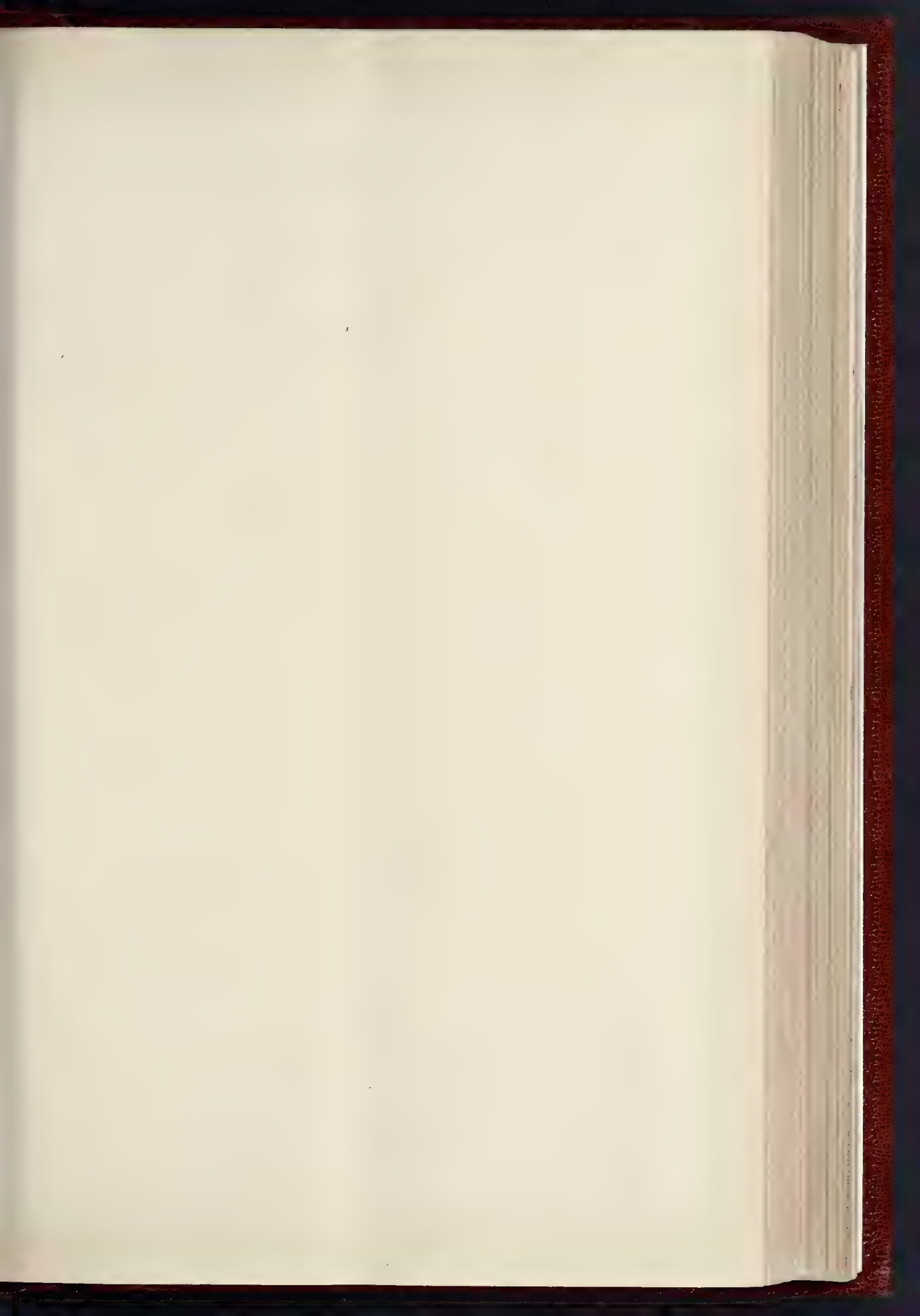
* The series of illustrations of the Ancient Cathedral of Scotland, which was begun in our issue of July 3, will be continued in the first number of each month, until December next. Particulars of this, and of the series of "Cathedrals of England and Wales," which ended in June last, will be found on page 182.

a crozier, and we may reasonably accept the story; the spot so chosen being, it is not at all unlikely, previously known to Columba as a suitable one. Hector Boece, first principal of Aberdeen University (who died 1536), is the earliest historian of the see, and its origin he connects with Malcolm II., 1010, at Mortlach. A more authentic date is 1136, when David I. appointed Nectanus first bishop of the diocese, then transferred to Aberdeen; in coins of his reign it is Aberdeen. There is notice of a new church by Bishop Matthew Kininmunde (1163-97), in turn removed by Bishop Cheyne (1281-1329), by King Robert Bruce's direction, that a building more fitting the importance of the see might take its place. This re-erection appears only to have been commenced and in part accomplished by a

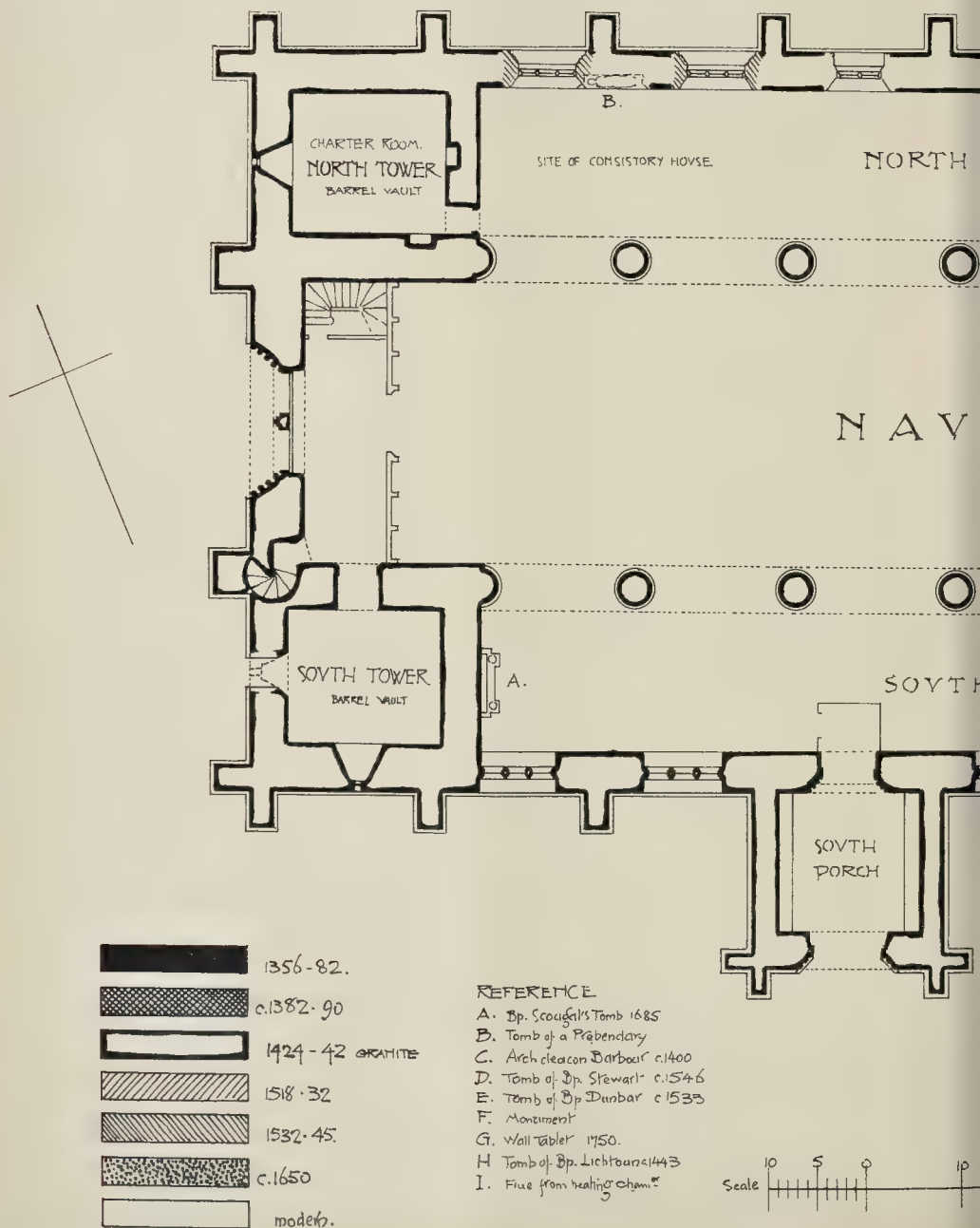
successor, Bishop Alexander Kininmunde II. (1356-82); no work now visible is of earlier date than that.

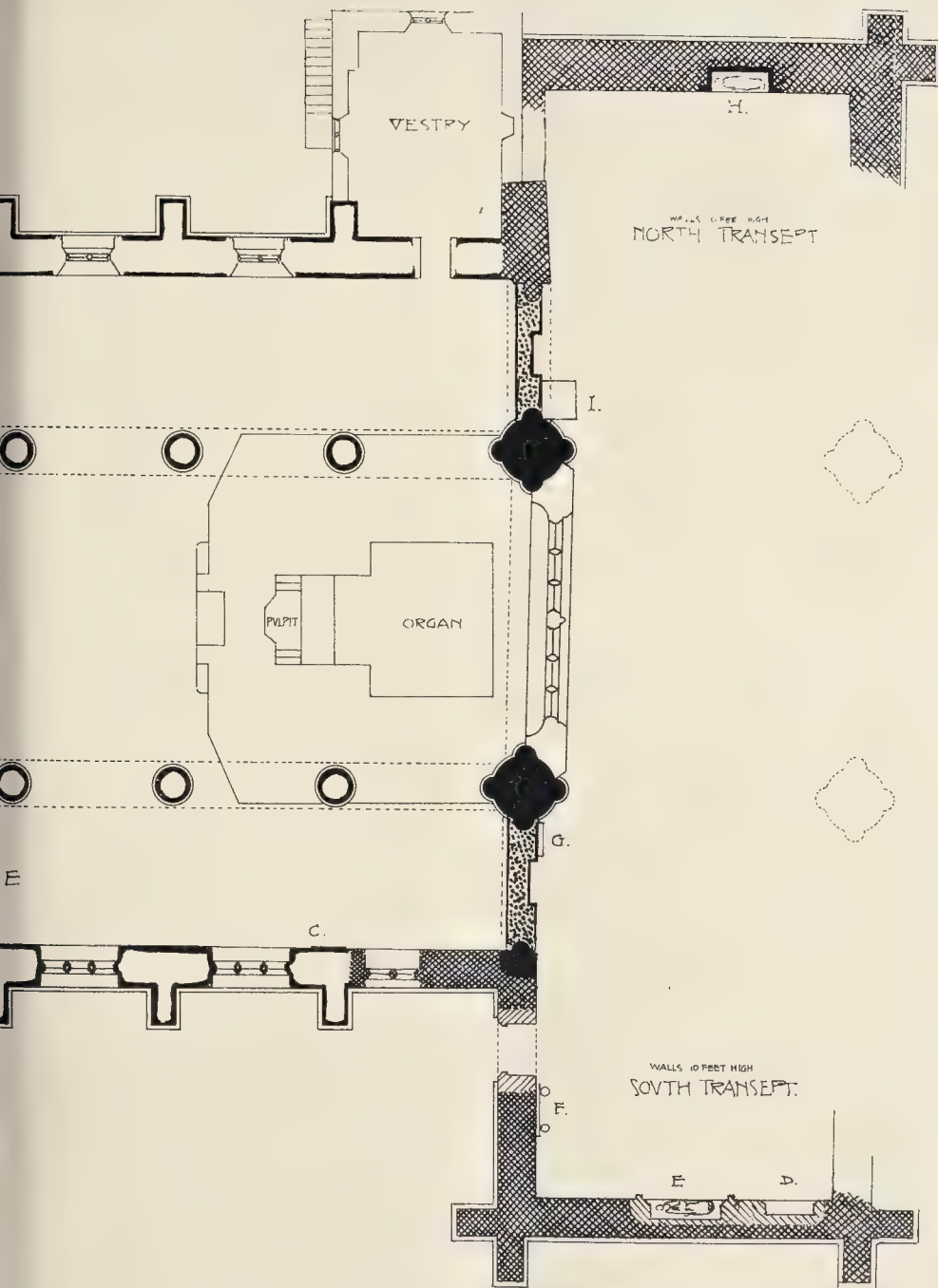
Of the Cathedral that existed before the Reformation, there remains now only the nave with aisles, and western towers; the two west piers of the vanished central tower survive its collapse in 1688. After that event a wall was built filling up the three east arches. North and south gables of single aisle transepts to the height of some 10 ft. also remain. The choir has totally disappeared, and excavations will require to be made before any idea of its extent or form can be obtained.

Different accounts are given of the amount of work the last-named prelate was able to undertake; all tell of its having at his death reached a

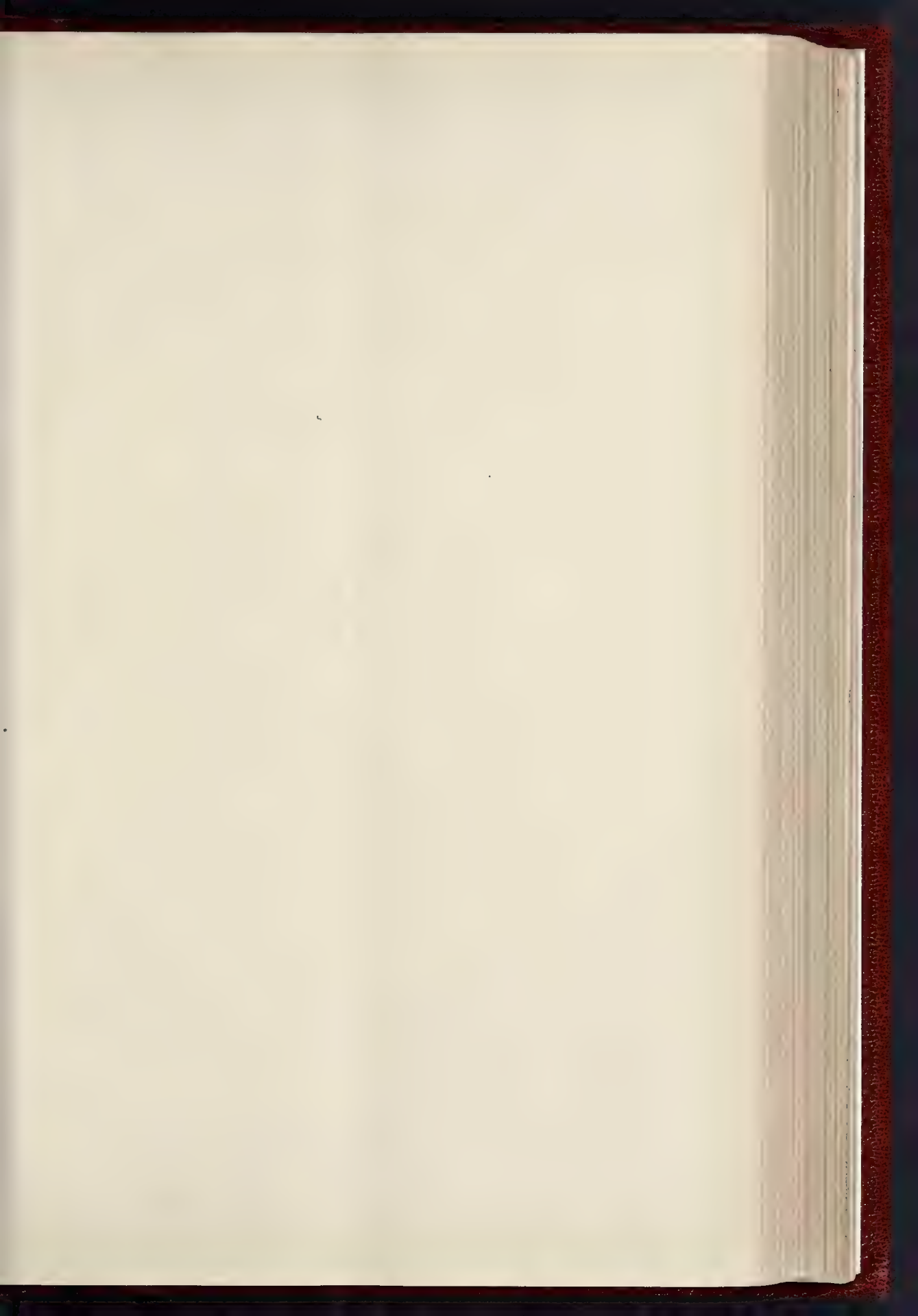


ST. MACHAR'S CATHEDRAL: ABERDEEN





Measured and drawn by
Alex. Mc Gibben -



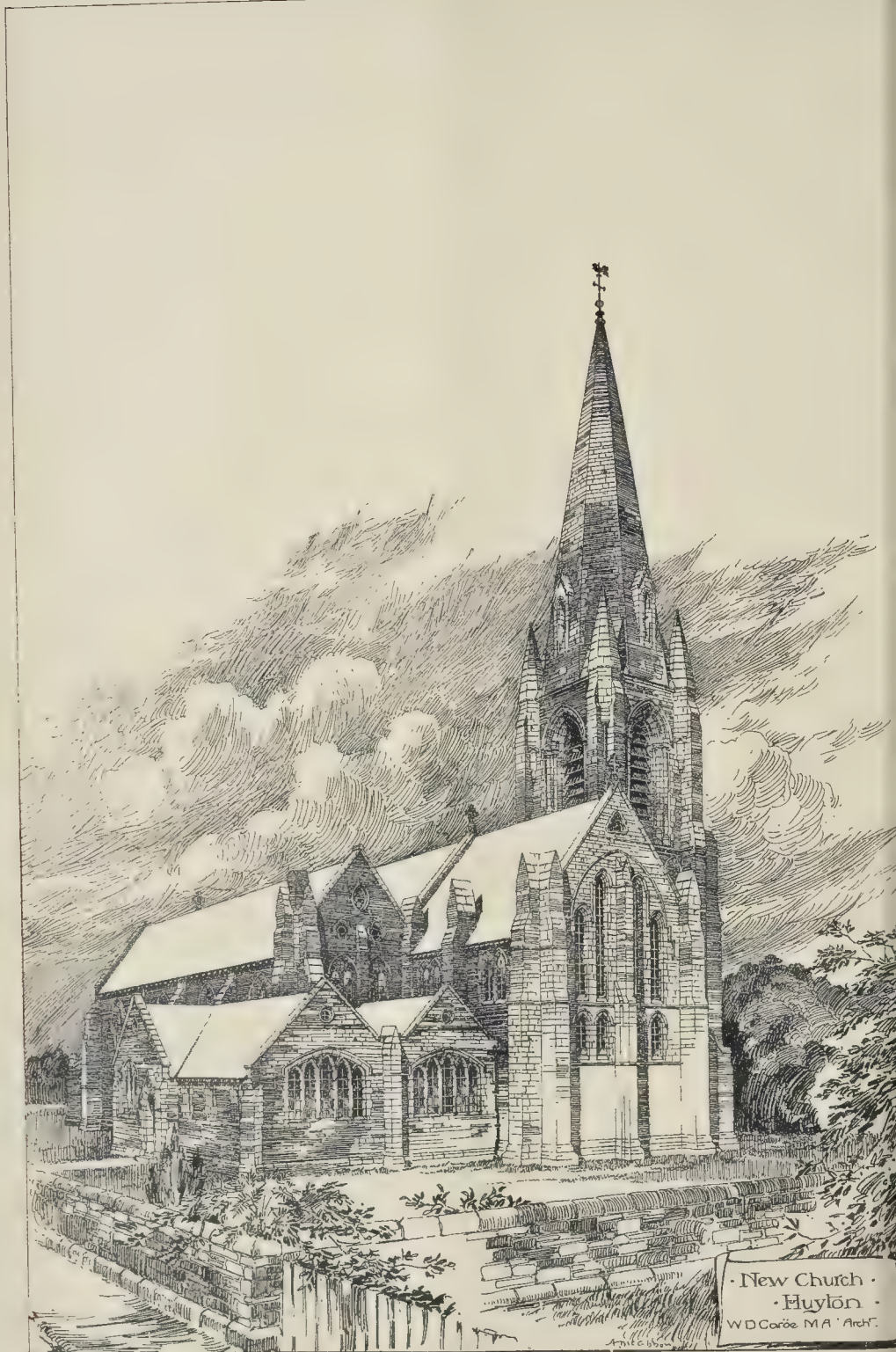
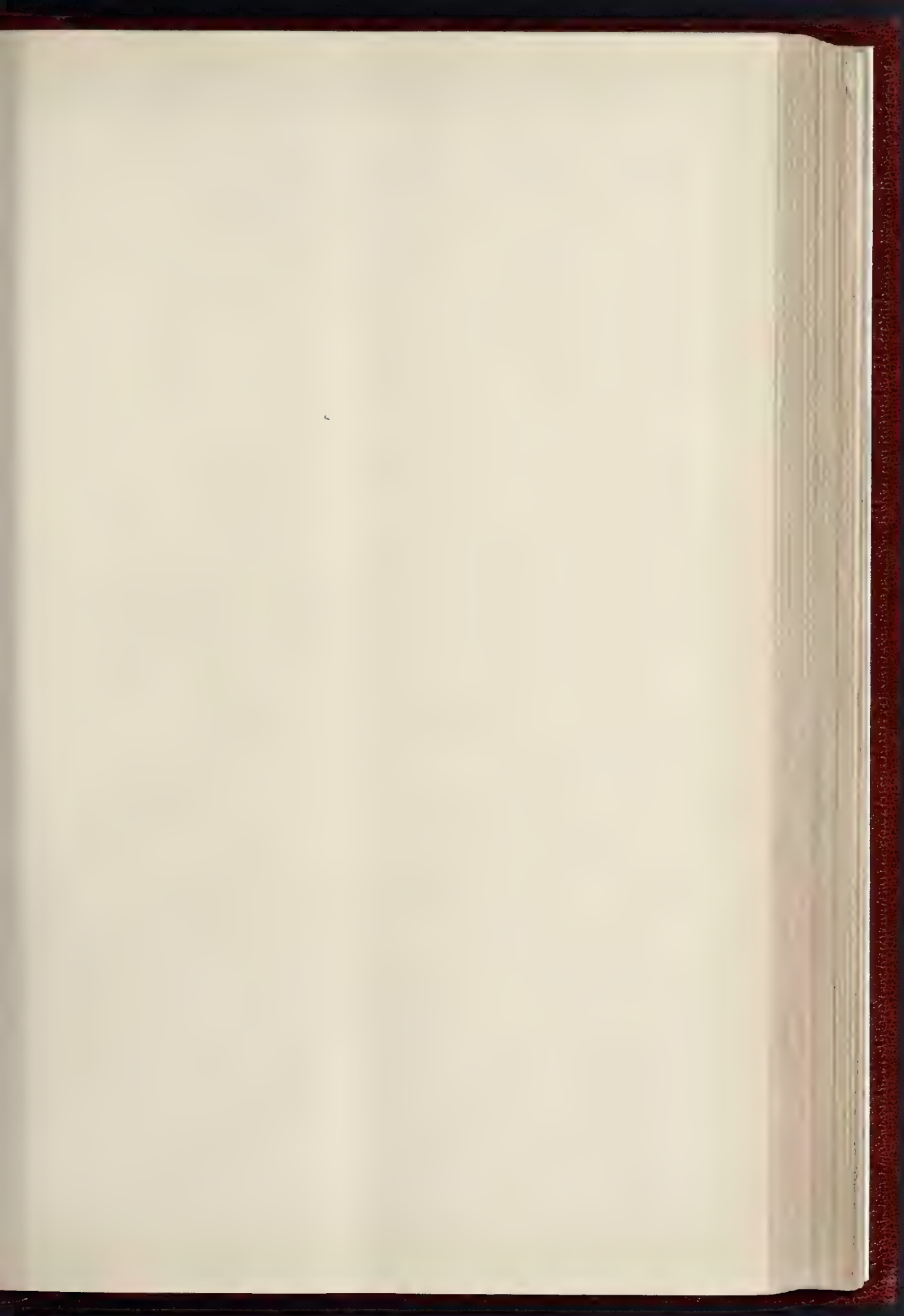
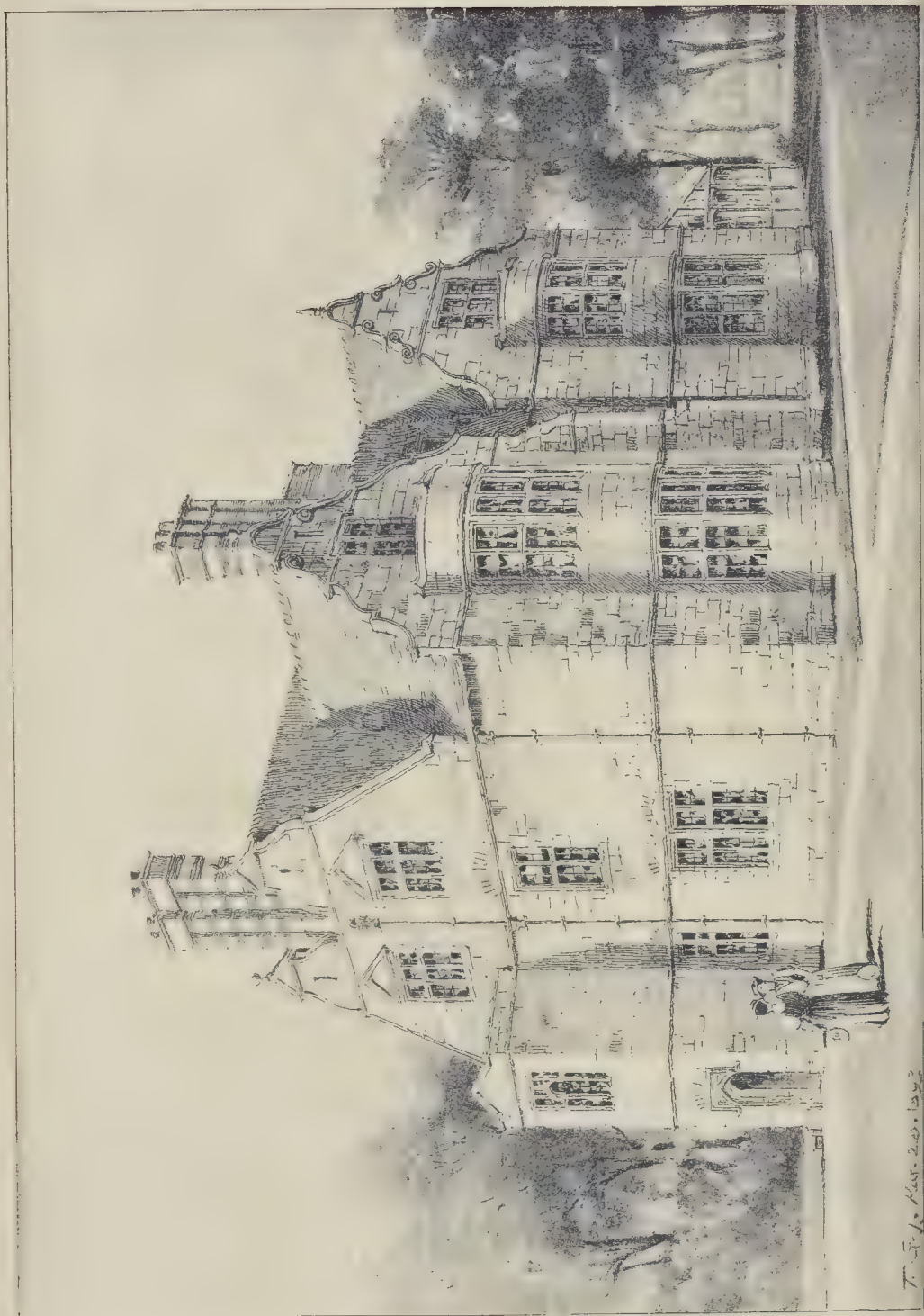


PHOTO. LIND. SPRACUE & CO. 4 & 5 EAST MADISON STREET, LONDON. W.C.



THE BUILDER, SEPTEMBER 2, 1893



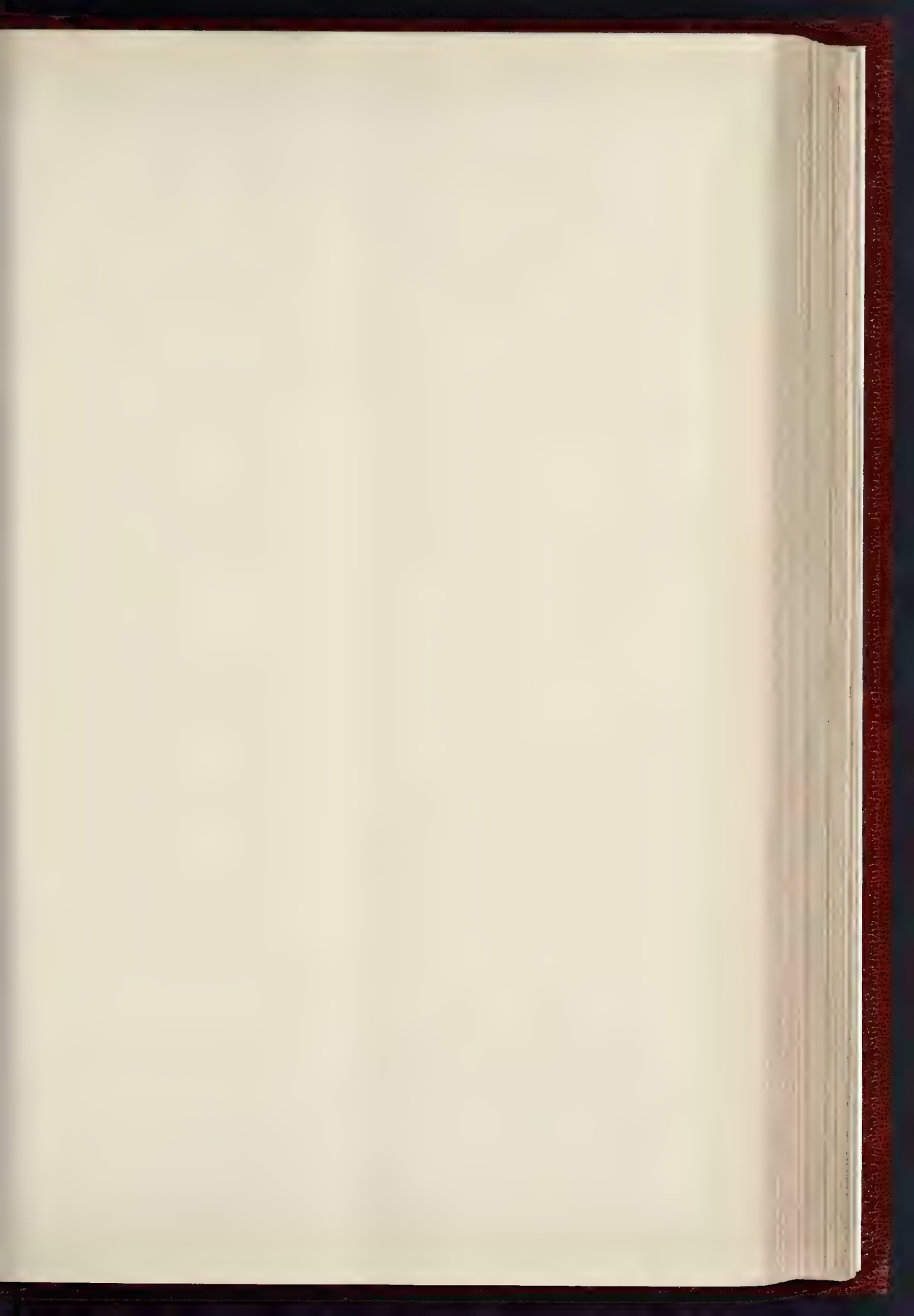


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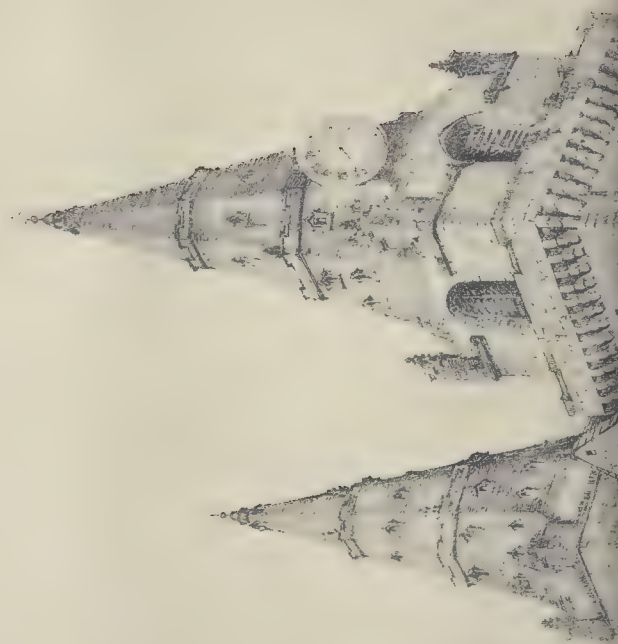
BALLIOL COLLEGE OXFORD NEW HOUSE FOR A TUTOR ON THE COLLEGE GROUNDS, HOLYWELL - MR T. G. JACKSON, A.R.A., ARCHITECT

Royal Academy Exhibition, 1893





THE BUILDER. SEPTEMBER 2, 1893





The South Porch

height of six cubits. No break at that level of the nave being observable, these can only have applied to the choir that has now disappeared. The piers of the crossing must have been of the same date; the two that remain are therefore the oldest existing part of the building. They are of excellent masonry, of red sandstone that has weathered better than the granite, and on the capitals is most delicate carving. How much was done to the nave at that time is uncertain; what was intended one can see at the springing of the nave arches from the great piers of the crossing, for these beginnings of nave-arches are of red sandstone richly moulded. The type of aisle window proposed is exhibited in the south aisle, east bay. This window, what is left of the transepts, and the arch in north aisle, are all of grey sandstone, and must be almost contemporary with the piers of the central tower. Bishop Lichtoun (1424-40) was the builder of the Cathedral practically as it now is, and elected to use granite; but the north transept is attributed to him, but this can only refer to work superimposed on the lower and earlier walling that still remains. The nave consists of seven bays, and there are two western towers—these were completed later—and all is of granite of the red variety. The material has been taken from the surface, and so is of inferior quality to that now employed locally for good building, but it has the artistic advantage that the colour is most varied and delightful, looking like a very rich yellow sandstone, while the softening of the edges of the ashlar takes away from the formality of that kind of masonry. Within, if the nave arches were but semicircular, it would be hard to resist the feeling, because of the massive circular piers, that one was in a Norman church. The little clearstory

windows are round, so too are the seven lights of the west window, and the main arch of the western door. Error in chronology has arisen from attention being directed chiefly to the architectural style, without taking account sufficiently of the obdurate material used that has influenced its forms; the mouldings, where they exist at all, are of an early type, but just because such were most simple in profile. The builders of Lichtoun's time seem to have made little attempt that at the junction of their work with that of their predecessors, the sandstone mouldings should have been continued in the granite, even when these were as bold and simple as what succeeded. For example, at the great arch to the crossing, a cavetto is abruptly stopped, and the profile is changed to an oculo. Lichtoun would appear to have added to the central tower above the four great arches; whether he at the same time vaulted it is uncertain—the springing in any case was higher than that of the nave arches. The western towers (completed) rise to a height of 112 ft.; originally only pierced with arrowlets, the larger windows of the south tower were added in the seventeenth century. The battlements were not apparently intended for much walking upon, as between the corbels it is open space.

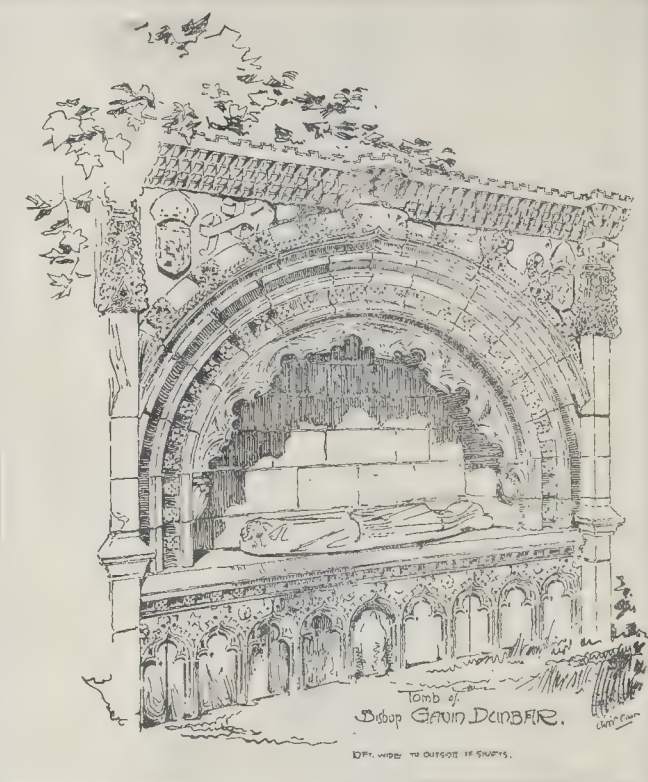
The west doorway has over its double opening a vesica recess, slightly ornamented; otherwise everything is plain. The jamb is a simple series of rolls, stopped by a flat band or plinth; the arch-mould is almost as bare, consisting only of simple rolls and fillets. It is observable that here, as at the south porch, the jointing of the wall ashlar does not line with that of the jamb, as might be expected with work built at one time. Entering, there is a low round arched door to the south tower; to the north tower there is a smaller entrance by

a lintelled door; both these ground floor apartments of the towers are barrel vaulted. Only the southmost of the two turret stairs descends to the church floor; the other stops a little above the sill of the west window, and was probably reached by a gallery at that level, this passage giving access at the same time to an upper chamber in the north tower. These two stairs lead to the clear-story passage, and also to that on nave and aisle wall-heads, the battlemented parapets of which were destroyed in 1604; by this circuitous route the central tower upper stages were reached. The south porch—popularly called the marriage porch—is slightly more elaborate than the other parts of the granite building, the arch mould of the entrance is richer, and the small niches, with the embellishments on the buttress weatherings, would almost seem to mark some distinction in the time of execution compared with the rest; as mentioned, there is an obvious break in the jointing of its masonry with that of the aisles. The lintelled window—its mullion gone—above the entrance is clearly an insertion, though Sir G. G. Scott considers it to be old. The presence of this window, as well as the height of the porch, induces the conjecture that there was once an upper chamber, but no trace is to be seen of supports for its floor, or of any stair up to it; access may, however, have been had to it by the passage on the aisle wall head before referred to. Seen from certain points, the pointed nave arches look but ill, as at the springing from the circular piers they seem to be off their centres. The south-east bay has a variation in the profile of its arch-mould not easy to account for. The south aisle windows (that in the east bay of earlier date excepted) are of a simple Decorated type, the jamb alike both inside and out, with the glass in the middle of the wall. The fact seems worthy of note that the buttresses do not correspond with the nave piers, but are set off at different centres, with the result that the one first coming upon the tower is not at its corner, as by right it ought to be, and the window in that bay comes hard against the tower in rather an unprepared fashion. Lichtoun seems only to have completed the nave to its wall head or so; his successor Lindsay roofed it in 1444. At first it would appear to have been covered only with slates, for in Bishop Elphinstone's time, 1484-1514, mention is made of its having received a lead covering. If this is the roof that was extant in 1866 it was one of the Cathedral's chief attractions. It gained Sir G. G. Scott's unbounded admiration, and is compared to that of King's College, Cambridge: only this example was of deal, whereas the English one is of Irish oak. It was formed of whole trees, simply squared, the rafters some 8 or 9 in. in scantling, and 2 ft. apart; each alternate one was tied. After about four hundred years' exposure (Scott was inclined to date the roof from Bishop Dunbar's time, 1518-32) it was in about the same state of preservation as oak of a like age, its weak point being that deal pegs had been used, and so the tenons had drawn somewhat. It was the only Medieval deal roof in Britain that Scott knew of. All this notwithstanding, the roof was taken off in 1866 because preservation would have entailed greater expense than providing a new one. Certainly it was not seen openly, being hidden by the heraldic flat ceiling, but surely some sacrifice might have been made to have retained a feature that particularised St. Machar's among all ancient British Cathedrals as distinctly as does the employment of granite.

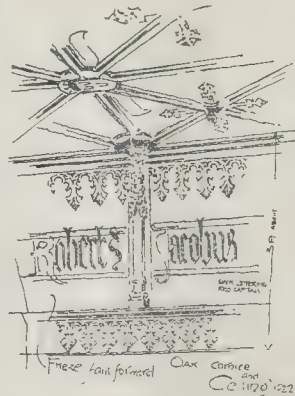
In Bishop Spens' time stalls and a bishop's throne were added to the choir (1450-80), and a greater addition was made by Bishop Elphinstone (1484-1514) in the completion of the central tower. It is described as carried up for four stories above the crossing vault, square, and battlemented; with a smaller tower terminated with a finial, having globe and weather-cock. The model is said to have been the church of St. John's at Perth. An engraving of an early date shows something resembling a saddle-backed roof as its termination, but it is hard to believe that this could have been the crowning feature of the Cathedral; it more likely was of pointed form—possibly of timber—with the weathercock as its apex. That the crossing was vaulted is likely, and to be inferred from an allusion in an old account of an "oval vacuity" possibly a regularly formed eye for admitting the great bells—a peal of fourteen, weighing collectively 12,000 lb., is chronicled—or some opening rudely made by the church's later tenants. The next additions, and the last, were made by Bishop Gavin Dunbar, 1518-30, and chief of these was the completing of the two western towers. He discarded granite, the octagonal steeples are built of grey sandstone, and though the more tractable

material permitted of greater detail, advantage has been sparingly taken of the opportunity, not to an extent that takes from the unity of the design of the tower as a whole. A "cake of lead" is mentioned as interposed between the old work and the new. Popular tradition has it that the resemblance the steeples have to a papal tiara was not unintentional. Dunbar also completed the south transept, but nothing of his work there is now visible except the small door inserted in the west wall. Within the church his great work was the erection of the flat-panelled oak ceiling with its three rows of shields of European kings, Scottish ecclesiastics, and Scottish nobles; the carved emblazoned cornice underneath has on it inscribed the names of Scottish sovereigns and bishops. This work dates from 1520, its artificer was one James Winter, from Angus. As before-mentioned, Sir G. G. Scott was of opinion that the roof overhead may have been made at this same time, seeing that its divisions coincided with the flat ribs and compartments of the ceiling. A notice of a high altar set up after this is the last concerning additions made to the Cathedral. Two tombs in the south transept of this period yet exist. That of Bishop Dunbar is of fine design and most beautifully executed, and where not actually smashed it is in good preservation; the cusped arch is of softer stone, and so has decayed badly, besides suffering violence; the effigy occupying this tomb is much mutilated, but the head-dress would seem to denote it a female. The tomb east of this, that of Bishop Stewart, is of quite another kind, poor in design and in workmanship; there is no effigy there now. The Cathedral was now (1545, death of Bishop Stewart) as complete as ever it was permitted to be; it contained at least nine altars, though the location of these is now uncertain. In 1544, reverses of fortune began, when, on the death of James V., an English invasion spread alarm, and for safety's sake Bishop Stewart, the second, last of the Romish prelates, sent off some of the churches' valuables, but these on the way were pillaged. In the Reformation troubles of 1560 the choir was ransacked, but the structure left; from records it is evident that it was even then only partially complete, as the high altar was temporarily stationed in the south transept, and somehow at that time escaped destruction. In 1604 the nave was stripped of its lead, and the battlements got destroyed. About fifty years later, the soldiers of the Protector, then occupying Aberdeen, removed wholly the hewn stones of the choir to build a fort in the town. In time this had the worst consequences, for the central tower, deprived of support, in 1688 collapsed, unfortunately just when remedial measures were being taken to secure it, but unskillfully. Before this time "lofts," or galleries, had been erected for the merchants of the town, and also for the College; these both were destroyed by the falling tower, and many tombs. Three bells, of date 1622, were, however, happily saved before the crash. In 1642 the High Altar—"almost as high as the ceiling, of rich wainscot, within Scotland there was not a better piece of work"—was demolished by the then minister, Mr. Strachan, who, however, thrifflily re-used some of its ornaments in a loft he "devised" and erected at the west end. The materials of the wrecked south transept were largely made use of by the college authorities. The west gable of nave about this time was built up, doors being left in both aisles—these are now blocked up. In 1722 a considerable sum was spent in the strapping and lathing of the interior, and side galleries were erected. About the beginning of this century the greater part of the north aisle was rebuilt, its windows have wooden mullions. The difference in size and position of the two westmost marks the situation of a Consistory house, the work of Bishop Stewart, that is referred to in records as formed to the north-west of the nave, having connexion with the Charter-room of north tower. This aisle has now a flat-leaded roof with plaster ceiling under.

About 1866 some reforms were effected upon Sir G. G. Scott's examination and report. The plastering and galleries were removed, and the heraldic ceiling exposed; unfortunately, the old roof, as already mentioned, was demolished. Later, a large window was opened up in what now forms the east wall of the church, obscured a few years ago by a large organ-case. Besides the tombs already noticed, there is, in the north transept, the damaged arched recess over the existing effigy of Bishop Lichtoun. Another and somewhat similar tomb, containing the effigy of a prebendary, stands in the north aisle. In the south aisle there is a small carved stone, originally outside, showing a slightly



cut figure under a canopy; this is believed to be the memorial of Archdeacon Barbour, 1330-96, the metrical biographer of the Bruce. The largest monument of all is that of Bishop Scougal, 1685. It yet shows marks of coloured decoration; at first it stood out in the aisle, but on some mishap was set back against the tower wall. On the



south transept buttress there is an inscription dated 1530, to Thomas French, whose father built that transept (upper part), and also the Bridge of Dee.

The chief sources of information that have been consulted are Orem's "Description of Aberdeen," 1724-5, Kennedy's "Annals," 1818, Sir G. G. Scott's "Report" of 1867, and "Heraldic Ceiling of St. Machar's Cathedral," 1888, by Principal Sir Wm. Duguid Geddes, LL.D., and Peter Duguid: this last gives references to most works on the subject, both ecclesiastical and architectural.

NEW HOUSE FOR TUTOR, BALLIOL COLLEGE, OXFORD.

THE house now being built on the Balliol College Cricket Ground by Mr. T. G. Jackson will be occupied by one of the college tutors. It is designed as part of a larger scheme for extensive buildings in connexion with the college, of which the rest is for the present postponed.

The builders are Messrs. Parnell & Son, of Rugby, and the clerk of works is Mr. E. Long. The drawing was in this year's exhibition of the Royal Academy.

CONGREGATIONAL CHURCH, HUXTON.

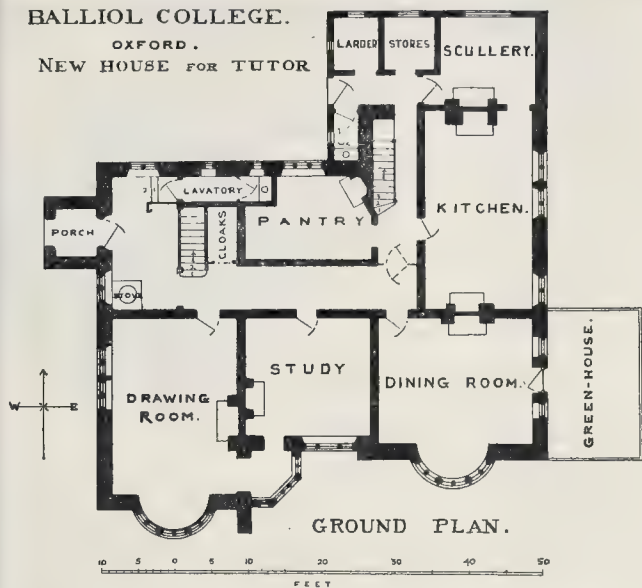
THIS church was erected at Huxton, Lancashire, about three years ago. Externally, Woolton red sandstone is used, and internally the whole is faced with Stourton stone. The roofs are carried upon stone principals in the form of transverse arches. The contractors were Messrs. Hughes & Stirling, of Liverpool. The organ was built by Mr. August Gern, of London. It is placed in a lofty chamber over the vestry with fronts towards the choir and north transept, and is played from a console upon the floor of the choir. The action is tubular-pneumatic.

The architect of the building is Mr. W. D. Caroe, M.A., and the drawing from which the illustration is taken was exhibited in this year's Royal Academy.

HOUSE AT TUNBRIDGE WELLS.

THIS is a solicitor's house and offices combined. One of the principal features in the plan is that the offices and house are kept distinctly apart, the former being approached from the road as shown, and the latter from a private road at the back. Owing to the high situation, excellent views are obtained all round, particularly from the bay window shown in the drawing. The walls are built hollow and faced with local red bricks, and the roof is covered with tiles from Dunton Green. The contractors are Messrs. Coles & Wood, of Tunbridge Wells. The architects are Messrs. Alfred Cox & A. W. Cooksey, and the drawing was exhibited in this year's Royal Academy.

BALLIOL COLLEGE. OXFORD. NEW HOUSE FOR TUTOR



GROUND PLAN.



Plan, Hynton Church.

COMPETITIONS.

ISOLATION HOSPITAL, WATFORD, HERTS. The Watford Union Rural Sanitary Authority, after an interview with the Local Government Board, have selected the design submitted in competition by Mr. C. S. Ayres of Watford. The ward blocks, three in number, will contain forty-six beds, and with the administrative block, stables, laundry, mortuary, steam disinfectant, gate lodge, and boundary walls &c. are estimated to cost 10,000*l*. The site is about one mile south-west of Watford.

THE PROPOSED NEW BATHS AT LEEDS. —At the last meeting of the Leeds County Council, it will be remembered, the recommendation of the Baths and Wash-houses Committee to accept the plans sent in by Mr. Walter Hanstock, architect, of Batley, for the erection of the proposed public baths in the city was referred back. Mr. Wilson then pointed out that in the instructions sent out to the architects it was stated that the committee favoured the system adopted at the Batley Baths. He complained that Mr. Hanstock, who was the architect for those baths, had in his plans sent to the Leeds Committee, revealed his identity by using the *nom de plume* of "Batliensis"; upon one of the plans also was the sentence, "Plan of baths just completing by author, costing 8,050*l*." On the 22nd ult. the members of the Baths and Wash-houses Committee met to reconsider the question. A letter was read from the Leeds Architectural Society, suggesting that arbitration should be resorted to. The majority of the members of the committee, however, were of the same opinion as when they made the recommendation—namely, that Mr. Hanstock's plans were by far the most suitable of those sent in. They therefore, in the interests, as they consider, of the inhabitants of the city, again decided to recommend the acceptance by the Council of Mr. Hanstock's designs. —*Leeds Mercury*.

BOARD SCHOOLS, MANCHESTER. — The monthly meeting of the Manchester School Board was held on Monday at the offices, Deansgate, the Dean of Manchester (Dr. Maclure) presiding. The General Purposes Committee reported that the sub-committee had examined the various designs which had been submitted to them for new schools to be erected in Holland-street, Nelson-street, and Queen-street, and that they recommended the designs of the following architects for submission to the Education Department:—Holland-street, Messrs. Woodhouse & Willoughby; Nelson-street, Messrs. Potts & Pickup; and Queen-street, Mr. Henry Lord. In order to safeguard the Board in the matter of the cost of the erection of the schools, the sub-committee recommended that the adoption of the foregoing designs should be subject to the condition that within a week of the meeting of the Board accepting the same the authors of the selected designs should obtain from a reliable builder a provisional tender showing that the schools could be erected according to the designs for a sum within 5 per cent. of the amount fixed in the instructions issued to the architects, and that the authors of such selected designs be clearly given to understand that if no such estimates can be obtained the Board may exercise their discretion of refusing to accept the designs. —The chairman moved the adoption of the proceedings of the committee, and Mr. Alderman Crofield seconded, and the motion was adopted. The school in Holland-street will be for 1,000 scholars, 650 boys and girls (mixed), and 350 infants, on the Central Hall plan, and estimated to cost 9,900*l*. The motto system was adopted for all the three schools competed for.

NEWCASTLE-ON-TYNE AND ITS CELEBRITIES. — In a "Note" in our number of May 4, 1889, we adverted to the establishment in Newcastle-on-Tyne of a "Memorial Tablet Fund," and gave the names of certain famous men—including Lord Collingwood, Akenside, Thomas Bewick, Lord Eldon, and his brother Lord Stowell, Charles Hutton, and Lord Armstrong—who rank amongst the worthies of Newcastle. The *Athenaeum* says it is proposed to place a tablet on the house, being No. 2, Framlington-place, where resided for many years Dr. John Collingwood Bruce, the scholar and antiquarian, and historian of the Roman Wall.

THE NORWEGIAN STONE INDUSTRY. —Last year the total exports of all kinds of building stone from Norway were valued at 45,500*l*., as against 46,000*l*. in 1891, and 40,000*l*. in 1890. A wealthy Norwegian merchant, Herr Anker, of Frederikshald, has purchased all the sandstone quarries in northern Norway. The stone quarried is the same as that of which the Cathedral of Throndhjem is built and various other prominent buildings in these parts.

THE CAMBRIAN ARCHÆOLOGICAL ASSOCIATION AT OSWESTRY.

(Continued from page 173.)

surroundings is given in a poem of the fourteenth century by Iolo Goch, which was read on the spot by the Ven. Archdeacon Thomas. A large oak beam, now at Llangedwyn Hall, was dug up in the moat two years ago.

On reaching Llangedwyn, the party visited the church, containing a recumbent effigy of a priest, the sole object of interest in the building. Afterwards the members were hospitably entertained to tea at Llangedwyn Hall by the Dowager Lady Williams-Wynn. Some Jacobite drinking-glasses were exhibited, and the whole house was most liberally thrown open for inspection. The walls of the upper rooms are adorned with tapestry, some of the subjects on which are what second-hand booksellers are wont to call "very curious" in their catalogues.

The only place visited on the return journey from Llangedwyn to Oswestry was Llanyblodwell Church, a building chiefly remarkable for having been restored by the Rev. John Parker, one of the leaders of the Gothic revival in Wales. There are two stone coffins in the churchyard, at the foot of the tower, and fragments of a sepulchral slab, with a hound pursuing a hare upon it, built into a low retaining wall at the side of one of the piers.

Oswestry was not reached until nearly 8 p.m. At the evening meeting, held in the Holy Trinity Mission Room, Mr. Arthur Baker read a paper on the local domestic architecture of the district around Llansilin entitled, "Some Residences of the Descendants of Einion Efell." It was well illustrated and shows what an amount of unexpected light may be thrown on the local styles of building by studying all the houses in one district with the aid of a good knowledge of architecture and history of the families in the neighbourhood.

The Rev. Elias Owen also read a paper "On the Use of Church Bells." The proceedings terminated with the usual votes of thanks.

THE JUNIOR ENGINEERING SOCIETY.

THE annual summer excursion of this Society, which has just taken place, passed off in a very successful manner. The district visited was Wilts, Devon, and Cornwall. Starting from London on August 11, the party travelled to Swindon for the purpose of seeing, on the following morning, the locomotive, carriage, and waggon works of the Great Western Railway. Plymouth was reached in the evening. On Monday the Government establishments were visited by special permission of the Lords of the Admiralty, facilities being enjoyed in connexion with the inspections. By the kindness of Mr. James Rooney, the superintendent, the Plymouth Great Western Docks were seen in the afternoon, steamer excursions being also undertaken to the Eddystone and up the Yeatin river. On Tuesday a special steam launch conveyed the party for a trip up the Tamar, the arrangement being to inspect Brunel's bridge on returning, which visit at the last, however, had unfortunately to be abandoned. In the evening the members proceeded to Penzance, the following day being occupied by an excursion by road to Land's End, during which at Porthcurno the sub-marine cable station of the Eastern Telegraph Company was visited under the guidance of the superintendent, Mr. W. H. Ash, and other officers; and the Botallack Mine was inspected, the manager, Mr. A. H. James, entertaining the party. Thursday was a very full day: Penzance was left at 7.45 a.m., Hayle being the first stopping place. Here Messrs. Harvey & Co.'s well-known engineering works, and Messrs. Williams, Harvey, & Co.'s tin smelting works were open to inspection, the respective proprietors receiving the visitors. Leaving Hayle, Camborne was reached, where Mr. William Thomas, secretary of the Mining Association and Institute of Cornwall, met the members, and directed them to the mining school, which, with the museum adjoining, was shown by the principal, Mr. J. Beringer. Dolcoath mine was then visited, Captain Josiah Thomas receiving the party and showing all the engines and extensive machinery at the surface; some of the members were enabled to descend to the 435 fathoms level, where underground operations were in progress; the working of the man-engine was also witnessed. After luncheon, by invitation of Captain Thomas, the party left in the afternoon for Truro to visit the Cathedral, Canon Donaldson showing them over. On Friday they

were most hospitably entertained by the committee of the Royal Cornwall Polytechnic Society, the arrangements including a steamer trip up the Fal and round the harbour; visits to Falmouth Docks, to Messrs. Cox & Co.'s engineering and shipbuilding works, to the sub-tropical gardens of Mr. Howard Fox; and a drive, after luncheon at the Polytechnic Hall, to Penryn and Carnarw to visit Messrs. John Freeman, Sons, & Co.'s granite works and quarries, where special preparations had been made for the occasion. In the evening the Junior Engineers' 1893 summer dinner was held at the Pendennis Hotel, Falmouth, Mr. Percy J. Waldram, vice-chairman, presiding, a number of guests being entertained. The next morning the party left for London, stopping en route at Exeter to visit the cathedral.

Correspondence.

To the Editor of THE BUILDER.

NOTES ON HYDRAULIC FORMULÆ.

SIR,—I have read Mr. W. S. Crimp's paper (reported at p. 141, ante, of the *Builder*), and as the object of it is to show the unsatisfactory state of the present formulæ at our disposal, I beg to suggest that further detail of the means adopted by that gentleman for proving inaccuracy of result re the Main Drainage Outfall-sewers' calculation is desirable, for bringing matters up to date in the way suggested.

As to the discharge of water over weirs, Mr. Crimp gives an instance where a difference of 20 per cent. in result is obtained by use of distinct formulæ. Is it reasonable to expect that we can get much nearer absolute accuracy, only to be determined by reservoir measurement after delivery?

The contingent circumstances must be so varied that the choice of a coefficient for any particular case would vary with the judgment and experience of the engineer.

As to sewers, Mr. Crimp regrets that, "as millions are spent every year on these works, no attempt to solve the difficulty has been made." Does this mean the data for calculating the capacity of a sewer for a given area, or does it mean the determining of the actual discharge of town sewers? It is well known that the Metropolitan Commission of Sewers had a number of experiments made re discharge of water through pipes (bearing upon the brick v. pipe war), but doubt has since been thrown upon the value of the results by a recognised authority, who, comparing them with Du Buat's formula, asserts that the experimental figures are unreliable; thus leaving matters more uncertain than before.

As to the design of the Metropolitan Main Outfall-sewers, being "in accordance with Eytelwein's formula," it would be interesting to have the figures, because Sir J. W. Bazalgette distinctly stated that he used Mr. Hawksley's empirical formula:

$3 \log. A + \log. N + 6.8 = \log. \text{of Diam. in inches.}$
A = area of district in acres.
N = fall in feet per mile.

It was only when pressed by his opponents, that the formula was made public with Mr. Hawksley's consent. So far as I know, it was in no way based on any existing formula of Eytelwein.

The result of the calculation which followed after the diameter was decided upon, was nearer 38,000 cubic feet discharged per minute for the triple aqueduct in question.

Mr. Crimp finds that it will discharge "33 per cent. more than it was calculated to do," and that the same is the case with the minor sewers.

Undoubtedly, this is what is to be expected, for if it were not for restriction in pumping power, or in reservoir area, why should the aqueduct not convey thrice the calculated discharge? Up to that limit, the only effect would be to increase the velocity of flow, i.e., if experiments are to be relied on.

It is also natural that auxiliary engines should be required after thirty years by the mere growth of the Metropolis, the increase of impermeable roof and paving &c., in outlying districts preventing to a great extent the absorption of rainfall; and pumps will not raise more than they are designed for, though the sewers which feed them (granted of course free outlet) will convey more than calculated to do.

Since Mr. Crimp requests that municipal engineers will send the result of experiments to him, I trust he will himself meanwhile favour your readers with further particulars of those reliable data, re outfall-sewer, he has been able to acquire since 1891, such as he states to be of value to the municipal engineer and the community at large.

E. W. HUDSON, F.S.I.

PUBLIC CLOCK, OTLEY, YORKSHIRE.—A new illuminated clock has just been erected in the New Arcade, Otley, by Messrs. Wm. Potts & Sons, clock manufacturers, of Guildford-street, Leeds.

The Student's Column.

GEOLOGY X.

LITHOLOGY OF AQUEOUS ROCKS.



ALTHOUGH in Nature we find plenty of thin beds of gravel, sand and clay raised above the sea-level, flanking the hillsides and occurring in the bottoms of valleys and although we discover immense thicknesses also of these deposits which have formed under the sea, in various parts of the country—showing how vastly different the physiography of the past must have been from the present, we yet find other kinds of aqueous rocks, to the origin and structure of which we have not hitherto alluded. We have said nothing respecting sandstones, limestones and the like; but it may be taken generally that, with a few exceptions presently to be specified, the other kinds of aqueous rocks are mere modifications of those already described.

We know that water can percolate all porous rocks, and that it nearly always contains mineral matter in solution. Now we may state that the character of most of the sedimentary accumulations has been altered by the action of this percolating acidulated water, which has not only in some cases partially, or wholly, dissolved the minerals of which the sediments were composed, but has filled up the cavities thus made, and interstices, with the mineral matter in solution alluded to.

In other words, the fragments or particles of which the loose, incoherent gravel and sand are composed, have been cemented together by mineral matter introduced through the agency of percolating water, and the whole made into solid stone. Thus, loose gravel is made into conglomerate, sand into sandstone, the shelly deposit into shelly limestone, and so on. From what we said in the last article, to which we will now refer the reader, it is easy to see that as each kind of deposit shades off imperceptibly into its neighbour, and as the natural cements which bind stone are of many kinds, there must be an endless variety of aqueous rocks; indeed, it may be said that no two of them a mile or so apart from each other are exactly alike.

The following are the principal varieties of sedimentary rocks—excluding limestones, which will be dealt with separately in the next article:—

Gravel.—Made of pieces of stone, which may be angular or sub-angular in shape, or of rounded kidney-shaped pieces, called pebbles. The stones may range in size from that of a pea up to that of an apple, or larger. The pebbles forming the famous Chesil Beach, near Weymouth, are 4 in. in diameter, and even more.

Breccia.—Angular fragments of stone bound together by some natural cementing material; it is often manufactured into exceedingly handsome varieties of marble.

Conglomerate.—Sub-angular, or pebble gravel bound together by iron, silica, or some other hard cementing mineral. It may form very rapidly; we observed an excellent illustration of this the other day on the shore near Blackgang Chine, in the Isle of Wight. The beach was strewn here and there with small brown pebbles, the cliffs near by contained a great quantity of iron, and the water which trickled therefrom was also strongly impregnated with that mineral, in solution. The water in passing over the beach on its way from the cliff to the sea had to percolate the small pebbles alluded to, and in so doing parted with much of its iron, which was left between the pebbles, and eventually bound great patches of them into solid conglomerate. In certain parts of Cornwall concrete made by nature in a somewhat similar manner has been used as a building material.

Grit.—Small pieces of stone up to 3 or 4 mm. in diameter, usually quartzose. A formation—the Millstone grit—from which millstones are made and many building stones are raised, is made of ordinary grit bound together by a cementing mineral, often silica.

Sand.—Minute grains of mineral matter, usually quartz. The particles may be rounded, sub-angular or sharp; a great deal depends on their shape in dealing with questions as to the suitability of sand for various building purposes, especially mortars. Very little attention has hitherto been paid to this point, though the matter has recently been brought forward.

Sandstone.—Grains of sand, more or less bound together by some infiltrating mineral, or compacted by pressure. Fig. 1 represents a photograph of a microscopic section of the well-known Red Corshill sandstone, from near Annan in Dumfriesshire, and gives a good idea of the structure of one in which the quartz and other

grains, after having undergone a certain amount of secondary alteration have been partially compacted by pressure and partially cemented together by silica and iron. In the illustration the lighter shades and white spots represent the quartz grains; the darker patches, mica and

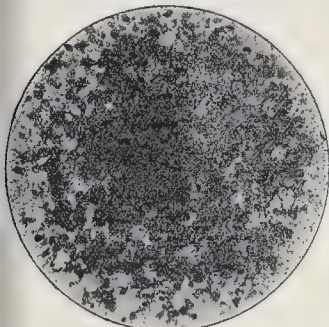


Fig. 1.—Micro-Structure of Sandstone.

portions of quartz grains covered over by an opaque film of iron; and the minute dark boundary lines to the fragmentary minerals are also iron. The microscope reveals in this, as in all other free working sandstones, small spaces between many of the grains; the latter are about $\frac{1}{16}$ in. in diameter.

Where the mineral matter acting as cement in sandstone is composed of iron, the stone is said to be *ferruginous*, and is usually red or yellow in colour; a *calcareous* sandstone is one in which the cement is chiefly carbonate of lime; *siliceous*, bound together by silica; *argillaceous*, where clay enters materially into the composition of the stone.

Micaceous sandstone is the name given to a variety which splits readily along tolerably frequent laminae, the surfaces of which are covered with mica. *Flagstone* is a thin-bedded sandstone, capable of being split along the planes of bedding—"Yorkshire landings" for example. *Loam*.—A mixture of sand and clay in variable proportions; it is a most useful material, out of which bricks, tiles, &c., are made.

Clay.—Derived chiefly from the decomposition of felspar; it occurs in the form of finely-divided particles, or mud, usually brownish or chocolate in tint owing to the presence of iron, and often containing a certain percentage of sand and other impurities. It is found in thin layers only a few inches in thickness, up to great deposits extending for dozens of miles, with a thickness, it may be, of 300 ft. to 400 ft. Clay is all important to the



Fig. 2.—Section in a brickyard at Erith, Kent; showing the variable nature of river deposits. a. Made earth. b. Contorted sand and gravel. c. Dark argillaceous clay. d. Clearly laminated sand, with land and freshwater fossil shells. e. Thin bed of contorted sand. f. Dark ferruginous clay. g. Light loam with peat in places; a row of concretions limits this bed both above and below. h. Dark loam.

architect, in the most populous parts of England often forms the foundations whereon enormous buildings are erected, but all the same it is very little understood, and has never been properly studied in the connexion indicated. Clays are

very deceptive in appearance, or rather, what many people would imagine was a clay frequently turns out on careful inspection to be something else, but is, nevertheless, treated by the architect as though it were clay, the footings, foundations, &c., being calculated accordingly, sometimes to the injury of the building erected, or occasionally causing much extra expense. We shall recur to this subject when treating of unsuitable sites for buildings; but it may now be stated that what many people regard as clay, is in reality a mixture of clay with a great quantity of exceedingly microscopic grains of sand, an addition which makes a considerable difference in its suitability for foundations. Clay properly prepared is used in the manufacture of terra-cotta, and when artificially mixed with sand, is commonly made into bricks.

The section, Fig. 2, shows the rapidly changing character frequently assumed by fluviatile sands, clays, loams, and gravels. At the time we sketched this section large pieces of flint were observable in bed d. The student will find many instructive sections in the brickyards in the neighbourhood of Erith and Crayford.

Kaolin, or China Clay.—A purer form of clay than the preceding, derived directly from the decomposition of felspar, and when very pure is a brilliant white. The better kinds are used in the manufacture of porcelain, but some *pipe-clays* and varieties are largely drawn upon by the potter for making so-called "architectural enrichments."

Fire Clay.—Composed typically of silica, 73.82; alumina, 15.88; protoxide of iron, 2.95; water, 6.5 per cent.; and traces of lime, magnesia, sulphuric acid, and chlorine. It is used in the construction of furnaces, &c., and will stand an intense heat. *Gannister* is a very siliceous variety employed in making bricks to withstand heat, and for other special purposes; it is also ground down as a material for the hearths of iron furnaces.

Boulder Clay.—A variety of stiff, sandy clay, often full of large stones (boulders), and exceedingly variable in its composition. In the eastern and north-eastern counties it commonly constitutes the foundations of houses.

Shale.—Hardened, thinly-stratified clay, which may be split along its planes of bedding; this structure seems to have been produced by pressure.

GENERAL BUILDING NEWS.

THE RESTORATION OF MOBBERLEY CHURCH, CHESHIRE.—The Church of St. Wilfrid and St. Mary, Mobberley, the nave of which was in a dangerous condition, is being repaired and preserved by Messrs. Cornish & Gaymer, of North Walsham, from the plans and under the superintendence of Mr. W. D. Caröe, M.A. An interesting Jacobean ringing gallery, the front of which has been unexpectedly discovered intact, is being replaced in the tower, and the floor lowered so as to disclose the piers of the arcade piers. A new south porch is also being added, to replace an erection of forty years ago, already in an unstable condition. About four years ago the church was restored by Mr. Crowther, of Manchester, a new organ chamber added, and also a chancel arch in stone.

CHANCEL, HOLY TRINITY CHURCH, LONGTON, STAFFORDSHIRE.—On the 17th ult. the foundation stone of a new chancel for Holy Trinity Church, The Meir, Longton, was laid by Mrs. W. E. Bowers. The nave of the church was completed and opened about May, 1891, at a cost of over 2,100*l*. The chancel to be erected will measure internally 28 ft. in length and 23 ft. in width, and will have six steps leading to the altar. On the south side will be a large arch opening into the organ chamber, to be erected hereafter, and on the north side a doorway will be made for communication to the vestry, also to be erected hereafter, and not included in the present contract. In construction the chancel will be built to correspond with the style of the nave. It will be 42 ft. high from the floor to the ridge. The floor will be paved with Minton's tiles, whilst the windows will have stone dressings inside and out. The lower portion of the walls will be laid with tiles, the upper portion being plastered. The exterior will be of red bricks with stone dressings, and in the east window there will be three lights. The contractors are Messrs. Tomkinson & Betteley, builders, of Longton, and the architects Messrs. Scriveners & Sons, of Hanley.

CATHOLIC CHURCH, LLANDUDNO.—On the 17th ult. the new Catholic Church at Llandudno, dedicated to "Our Lady, Star of the Sea," was opened. The church is so arranged as to include a chancel terminating by an apse and flanked by side chapels. Three arches separate these portions of the building from the nave and the north and south aisles of the latter. At the end of the south aisle is a baptistry, and at the end of the north aisle an entrance porch. The columns of the nave arcade are of polished granite of various tints from Shap-

in England, and Mull, in Scotland. Instead of the ordinary plaster work for the arches, Runcorn stone, with mouldings, has been used. In the design, the architect, Mr. Edmund Kirby, F.R.I.B.A., of Liverpool, has followed the Gothic style of the close of the fifteenth century. Mr. J. D. Williams, of Knighton, Radnorshire, was the contractor, Mr. Eaton, of Liverpool, being clerk of the works.

EXTENSION OF SCHOOLS, ROCHE DALE.—On the 12th ult. the memorial stones were laid of an extension to Castlemere Methodist Schools, Rochdale. The contract for the building was placed in the hands of Messrs. Peters & Sons, of Townhead, and the architect for the new building is Mr. J. G. Sankey, of Manchester. The building will be of brick, with stone dressings, moulded stone strings and cornices. It will be one story in height, and will comprise twelve class-rooms and a large lecture-room capable of accommodating about 250 persons. The lecture-hall will have an open roof and will be lighted from the top. The entrances in William-street and Devon-street will be surmounted by turrets. The cost of the whole of the work is estimated at about 2,000*l*.

WESLEYAN SUNDAY SCHOOL, PONSANNOOTH, CORNWALL.—On the 24th ult. a new Wesleyan Sunday School was opened at Ponsanooth. The building is the design of Mr. A. S. James. The font is of Plymouth limestone, with a free use of granite dressings from the quarries of Freeman, Sons, & Co. A prominent feature is a large central window in Early English style with granite mullions. The whole of the windows are filled with tinted glass. Externally the building measures 70 ft. by 36 ft., containing one large room 50 ft. by 32 ft. with a height of 20 ft. At the rear are four class-rooms. The roof is open. Accommodation has been provided for 350. Entrance to the building is obtained on the west side through a porch. The contractors were Mr. A. S. James, carpentry, and Mr. W. Mead, masonry.

PUBLIC LIBRARY, &c., WESTMINSTER.—On the 21st ult. the Baroness Burdett-Coutts opened the new library building in Great Smith-street, Westminster, for the united parishes of St. Margaret and St. John the Evangelist. The new building includes on the ground-floor, entrance-hall, a lending library, issuing room, ratepayers' reading-room, ladies' reading-room, newspaper reading-room, 60 ft. by 25 ft. 6 in., and reference reading-room, 36 ft. by 25 ft. 6 in. On the first floor is the Board-room and rooms for the residence of the librarian. In the basement and on the second floor is storage for 100,000 volumes. The public rooms are fitted in polished American walnut. Electric lighting has been fitted throughout the building. The cost of the site of the new building and the furnishing is given at about 14,000*l*. The architect was Mr. F. J. Smith, and the contractors were Messrs. Stimpson.

On the same day Mr. Burdett-Coutts opened the new public baths and washhouses, which have been erected on a spot adjoining the library. The entrances to the baths are in Great Smith-street and St. Ann's-street, the former being for first-class men's and women's private baths and first-class swimming-bath, and the latter for second-class men's and women's private baths, the second-class swimming-bath, and the public laundry. The swimming-bath has a water surface of 125 ft. by 31 ft. The laundry will give accommodation for eighty-six washers.

ENLARGEMENT OF ST. MICHAEL AND ALL ANGELS' CHURCH, BISHOPSTON.—The work in connexion with the enlargement of St. Michael and All Angels' Church, Bishopston, Somerset, has now been taken in hand. The contractors are Messrs. R. Wilkins & Sons, and the architect is Mr. J. Bevan. The enlargement consists of new north aisle and transept, with new vestries and organ chamber, and will increase the accommodation of the church by over 250 sittings.

RESTORATION OF ST. STEPHENS-IN-BRANWELL CHURCH, CORNWALL.—The Parish Church of St. Stephens-in-Branwell is undergoing restoration from designs by Mr. George Fellowes Frynne, architect, of Plymouth and London; Mr. James Julian, of Truro, being the contractor. The estimated cost of the whole work is about 1,600*l*.

SHOWROOMS, LIVERPOOL.—The pianoforte show-rooms of Messrs. Crane & Sons, in Scotland-road, Liverpool, have been rebuilt and remodelled. The premises, as enlarged, form three complete buildings, all connected together. The principal building has a frontage to Scotland-road of 49 ft. The floors are all connected by one of Waygood & Co.'s lifts. The back building contains on the ground floor a large pianoforte manufactory. On the first floor of the building is another large showroom. The building throughout is fitted with the electric light. The work has been executed from designs and under the superintendence of Mr. J. Haylock Sutton, architect and surveyor, of Liverpool, the contractors being Messrs. Paterson & Sons.

WAREHOUSE, SMITHFIELD.—A new building has just been opened at West Smithfield by Messrs. Pratt & Sons, bacon, butter, and egg salesmen, Central-market, E.C. The building is situated in Peter's-lane, and has a frontage of some 56 ft. The architect was Mr. Lewis Solomon, of New Broad-street, and the builder, Mr. Wm. Reason, 100, St. John-street, E.C. The cost has been about 3,500*l*.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*Alterations and Extension to Workhouse.	Stockport Union.	£200, £100, £50.	Dec. 1
*New Infirmary.	Sunderland Union.	£50, £25, £15.	No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Additions to School of Science and Art.	Brimley Local Board.	Putts, Son, & Henshinge.	Sept. 5
*St. Thomas's and St. George's Hospitals.	Met. Asylums Board.	A. & C. Herston.	Sept. 6
*St. George's Hospital.	Met. Asylums Board.	Official.	Sept. 9
*St. George's Hospital.	Met. Asylums Board.	Official.	Sept. 11
*St. George's Hospital.	Met. Asylums Board.	Official.	Sept. 12
*St. George's Hospital.	Met. Asylums Board.	Official.	Sept. 13
*St. George's Hospital.	Met. Asylums Board.	Official.	Sept. 14

CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Infectious Diseases Hospital.	Birkenhead Corp.	Official.	Sept. 18
*Walls, Gates, and Fencing.	Acton Local Board.	D. J. Ebbetts.	Sept. 19
*District of Unsettled & Fencing Works.	Chilwell & Local Board.	A. R. Hadden.	Sept. 21
*Laying Concrete Flags.	Walthamstow Local Bd.	G. W. Holmes.	Sept. 22
*Painting Works at St. John's, Mansfield.	Central London School.	Official.	Sept. 23
*Fire Farm Hospital.	Met. Asylums Board.	A. G. Langdon.	Sept. 24
*Restoration of Westleigh Church, Gloucester.	Met. Asylums Board.	A. & C. Haddon.	Sept. 25
	Building Committee.	Settling & Wilson.	Sept. 26

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Sanitary Engineer.	Trafford U.S.A.	.....	Sept. 5
*Road Foreman.	Gt. Yarmouth U.S.A.	2,000.	Sept. 10

Those marked with an Asterisk (*) are advertised in this number. Competitions, p. iv. Contracts pp. iv., vi., viii, and xxiii. Public Appointments, p. xx.

CONSERVATIVE CLUB, NEWPORT.—Plans prepared by Messrs. Habershon & Fawcner, of Newport, Mon., have been accepted for the erection of a new Conservative Hall and Club at Newport. On the ground floor of the building (frontages to Stowhill), will be four shops, and offices for the Newport Conservative Association (separate entrance), and immediately behind the shops, the hall for concerts, meetings, and public engagements (the room will be approached by a large central entrance). There from North-street. On the first floor there will be a dining-room, smoke-room, and reading-room. A billiard-room is provided on the second floor, together with the caretaker's rooms. A special feature has been made of the department for working men, smoke-room, reading-room, billiard-room, skittle alley, &c., being provided. The total cost of the building will be 6,000.

FOREIGN AND COLONIAL.

FRANCE.—An exhibition of Mahomedan art is to be opened at the Palais de l'Industrie, during the first half of September. There is some talk of building a mosque at Paris, where the Mahomedan colony, a tolerably numerous one, at present possesses no place of worship. The "Photoclub" of Paris is to open its first exhibition of photography from the 10th to the 30th of December next. The Académie des Beaux-Arts has awarded the Leclaire Prize to two young architects, M. Pille, pupil of M. Pascal, and M. Daune, pupil of M. Ginain. A committee has been formed at Nogent-sur-Marne to raise a statue to M. de Villiers, former Minister of Fine Arts under Napoleon III., who left to that town an estate on which now stands the fine Mairie, built at the cost of the donor of the land. A rich inhabitant of Paris, M. de Villiers, has purchased the frescoes by Tiepolo which decorate the Contarini Palace. The Conseil Général des Ponts et Chaussées has given its approval to the scheme for improving and enlarging the port of Dieppe. The cost of the work is estimated at 1,800,000 francs. The new museum at Calais was inaugurated last Sunday in the old Hôtel de Ville on the Place d'Armes. At Kerer, in the environs of Vannes, there has been discovered a bronze vase decorated with figures representing "Love Subduing Hercules," and in which were about fifteen hundred coins of the third century A.D. The Baron Alphonse de Rothschild has given to the Tavel Museum, at Pontoise, a bronze reproduction of M. Boucher's now celebrated group, "Au Bain," and has also presented to the Museum of Perronne a view of the port of Marseilles, executed by the Marseilles artist Eugène Martin. The museum at Rheims has received a fine collection of pictures, drawings, pastels, and water-colours left to it by a rich amateur of Paris, M. T. F. Kasparek. The new museum at Cambrai is shortly to be inaugurated. It occupies for the present a large mansion left to the town by a collector of Cambrai, M. Legrand, in 1888. The death is announced of a Breton artist, M. Louis Lereste, whose last work, a group in wood called "Les Lutteurs," attracted much attention at the last art exhibition at Vannes. M. Jean Paul Laurens has just completed, at the Paris Hôtel de Ville, his large mural picture representing "Louis VI. Octroyant aux Parisiens leur Première Charte." The picture forms part of the decorative scheme entrusted to this artist for the Salon Lobau. The "Commission de Voirie" of the Municipal Council of Paris has decided on the filling up, for hygienic reasons, of the celebrated "Vallée de la Bièvre," between the Butte aux Cailles and the suburb of Montmartre.

PROPOSED INTERNATIONAL EXHIBITION IN MADRID.—An International Exhibition of Arts and Industries, under State and Royal patronage, is to be held in Madrid from April 1 to October 31 next year, on the lines of the Barcelona Exhibition of 1888. A prospectus has been issued for the guidance

of intending exhibitors. There will be fourteen sections, of which some will be duly devoted to art, architecture, engineering, and electricity.

STAINED GLASS AND DECORATION.

THE MAYOR'S WINDOW, PARISH CHURCH, FAVERSHAM.—The new stained glass window, erected by the present Chief Magistrate and seven past Mayors of Faversham, has just been placed in the north transept of the parish church. There are two Scripture subjects, one at the top and one at the bottom, and there is also a long scroll bearing the names and dates of the Mayors. At one end of this appears the arms of the Mayor, and at the other the arms of the Cinque Ports. The work has been executed by Messrs. Lavers & Westlake, of Endell-street, London.

MEMORIAL WINDOW, ST. ANDREW'S CHURCH, GLASGOW.—Mr. Stephen Adam, of Glasgow, has just completed a stained glass window, which will shortly be erected in St. Andrew's Church as a memorial of the late Rev. Dr. F. L. Robertson.

WINDOW, PARISH CHURCH, DUNDEE.—A stained glass window has just been placed in the north clearstory of Dundee Parish Church in memory of Provost Lawson. It represents Enoch and Abraham, and is the gift of Miss Helen Lunan. Messrs. Morris & Co., through Mr. T. S. Robertson, executed the work from cartoons by Mr. E. Burne Jones, and Messrs. Lindsay & Scott, Dundee, fitted the window in its place.

MISCELLANEOUS.

STREET BARS AND POSTS.—The London County Council, acting under provisions of the London Streets (Removal of Gates) Act, passed this year, have served notices upon the several owners for removal of certain gates or obstructions, the owners having failed hitherto to agree with the Council for the removal thereof. The gates and rails stand in Vigo-street (western end), by Savile-row, on the Sutton estate; Lime-grove, Hammersmith, owned by the trustees under the late Ferdinand Scott's will; Wagner-street and White Post-lane, owned by the St. Giles, Camberwell, Vestry, and the Greenwich District Board of Works; and across the road and footway of Highgate-grange, Highgate, the reputed owners being Mr. G. L. Hodgkinson and Mr. A. Pulling. The Council have already dealt with fifty-nine similar obstructions under powers of the Act, according to their Chairman's last annual address.

A HANDBOOK OF PRACTICAL BUILDING CONSTRUCTION.—Messrs. Crosby Lockwood & Son will publish this month a handbook on "Practical Building Construction," by Mr. J. P. Allen, Lecturer at the Durham College of Science, Newcastle-on-Tyne, whose aim, we are informed, in compiling the volume has been to meet the wants of students preparing for the South Kensington and professional examinations on the subject. The work will be illustrated by about 1,000 diagrams.

DISAPPEARANCE OF AN OLD BUILDING, GLASGOW.—The operations in connexion with the extension of the Bonanza Warehouse, Glasgow, have, says the *Glasgow Herald*, involved the disappearance of a relic of ancient Glasgow. For about a century the building which was known latterly as His Lordship's Hotel, occupied a prominent site at the north-west corner of St. Ennoch-square, and during that time many changes took place. Towards the close of last century the square was a very fashionable residential quarter. But in less than forty years after its completion the square was in the state of transition with which dwellers in towns are familiar, namely, the private residence giving place to the mercantile office and the warehouse. In the case of the building just demolished, however, it seems to have been early converted into a hotel, which became widely known.

THE ELECTRIC LIGHT AT SCARBOROUGH.—The Scarborough Electric Supply Company, Limited, commenced the supply of electricity in Scarborough

on the 26th ult. As yet the current is only available in a portion of the town, but the remaining connections are being completed as fast as possible, and it is expected that in the course of a week or two the whole of the mains will be in operation. The alternate current, high-tension system, with low-tension distribution from sub-stations, is employed. The charge for electricity is at the rate of 7d per Board of Trade unit. The whole of the electric generating plant and transformers have been supplied by Messrs. C. A. Parsons & Co., of Newcastle-on-Tyne.

MEMORIAL PULPIT, LODDISWELL CHURCH, DEVONSHIRE.—On the 24th ult., the new pulpit in the parish church of St. Michael, at Loddiswell, was dedicated. It has been designed by Mr. Parsons and has been placed on the north side of the church building, just at the junction of the transept and chancel, and is approached by four easy stone steps. The main part of the fabric is of Beerstone, but alabaster and Devonshire marbles are also introduced. The pulpit is of thirteenth century character, octagonal on plan, the upper part being carved with foliage and diaper work of Early English type. The inside of the pulpit is panelled with oak wainscoting work. The work has been carried out by Messrs. Harry Hemmings and Sons, of Exeter.

NEW BUILDING ESTATE, SOUTH SHIELDS.—For the past nine months operations have been in progress in laying out a building estate on the southern boundary of the borough of South Shields. The land, which belongs to the Ecclesiastical Commissioners, comprises ninety-seven acres. It is bounded on the north by Oxford-street and Wood's terrace, on the south by Harton-road, on the east by Caldwell, and on the west by Stanhope-road. Almost three miles of sewers are being laid, of which over a mile consists of brick culverts, varying in diameter from 4 to 6 ft., in which the first outlay of 7,500. New roads are being formed at the cost of 2,600. Mr. Henry Grieves, A.R.I.B.A., of South Shields, acting as architect and surveyor for the Commissioners, is superintending the laying out of the estate, the works being under the personal charge of Mr. H. Lane Brown. The contractor for the drainage is Mr. Young, and the pipes and brickwork are laid in by Mr. Hornby and Mr. Wilson.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

16,880.—**MITRE-BOX:** A. E. Mears.—This apparatus which is designed to be affixed to a joiner's plane, is constructed with a bed-plate of metal, to which is hinged a frame having two ledges or slides extending longitudinally. The frame is made with an opening in the centre narrower than the plane, but wide enough to allow the mitred end of a strip to be planed or "trued up" to project through the front of the frame. The strip is held by two cheeks controlled by screws and nuts. The frame can be rapidly adjusted to any angle, an indicator being provided to show the angle at which it is placed. The frame, when not in use is turned over on top of the bed plate forming a compact and portable apparatus.

16,901.—**DOOR-KNOBS:** R. and E. Collier.—The knob is the subject of this patent, is made of chip wood, or papier-mâché, and the neck of metal and the knob and neck or collar are fitted so as to make a complete knob. These are not so liable to break, and are more securely attached to the spindle than the ordinary kind.

18,012.—**WATER TAPS:** C. H. Cox.—To enable water to be drawn off from pipes in frosty weather a tap is provided in this invention, placed in the pipe as near the main as convenient. This tap has a plug with three ports to openings at equal distances from each other, two leading to the opening of the shell and the other to the delivery opening. The ordinary water flow flows through the tap to the house, but one-third more turns to the right and the water is shut off from the main, and the pipe leading to the upper part of house can be emptied; another turn to the right and water can be drawn from the main; one other turn and the water is shut off altogether; and complete the revolution the tap acts in the ordinary way.

18,023.—**Pipe Fitting:** J. H. Murray (Jr.) U.S.A.—With the object of preventing leakage in a pipe joint this fitting consists of a coupling, a follow with a threaded connexion and a second thread to

Telegraphic Addresses—London Office, "JOHN KNOWLES, LONDON." Works Office "KNOWLES, WOODVILLE;" London Telephone No. 2.
Sheffield Telephone No. 11.

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N.B. for J. Douglas Fletcher Esq

W. F. Lakeport 1893

The Builder.

VOL. LXXV. No. 2640.

SEPT. 11, 1893.

ILLUSTRATIONS.

The Mansion, "Rosehaugh," N.B.—Mr. W. Flockhart, Architect	Extra Large Photo-Litho.
Mission Building, Whitechapel.—Mr. W. A. Pite, F.R.I.B.A., Architect	Single-Page Ink-Photo.
Homœopathic Hospital, Great Ormond-street.—Mr. W. A. Pite, Architect	Single-Page Ink-Photo.
Pulpit, All Saints' Church, Enford.—Mr. C. E. Ponting, F.S.A., Architect	Single-Page Ink-Photo.
Design for New Chapel, Gray's Inn.—Mr. A. H. Skipworth, Architect	Single-Page Ink-Photo.

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The Age of Disfigurement.



MOST of our readers will recall the public controversy which was raised some little time since by a letter from Mr. Waterhouse in the columns of the

Times in regard to the increasing disfigurement of town and country by large advertisement placards. That controversy has not been thrown away so far at least as this, that it has led to the formation of an association under the title "The National Society for Checking the Abuses of Public Advertising," which is at present only commencing its work, but which is pledged to do all in its power to bring about legal restrictions and checks on the abuse of advertising. The small book published under the title given at the head of this article* is a general statement of the case against the advertisers by Mr. Richardson Evans, the Honorary Secretary of the Society referred to, and to whose efforts in fact the formation of the Society is mainly due.

It may be open to question, perhaps, whether we have the necessary data for distinguishing the present age as the age of disfigurement in a special sense. It may be that we have not evidence enough to decide that point. Advertisements are necessarily temporary devices and do not leave their record behind them. We are not in a position to say what the Egyptian tradesman may have been capable of in the way of advertising cheap mummifying, or specially excellent compounds for the preservation of the body. Pompeii seems to present us with evidences at least of a prevalent desire to inscribe things on the walls without much consideration for æsthetic effect. But in the days nearer to our own we do not know of any such persistent and widespread craze for advertising as that which exists at present, and the probability is that the thing could hardly have been done on so large a scale in days when there was no printing. At all events there can be no question that at the present moment the competition in the production of large and staring advertise-

ments has come to such a pass that the whole face of town and country is in process of being altered and degraded by it, and that it is a kind of nuisance which in the nature of it must go on increasing in a great ratio unless checked by authority. For the whole principle (if we can apply that sacred word to such an unprincipled proceeding) of the class of advertisers of whom we most complain is to endeavour to produce something which shall be more obtrusive and more glaring than anything else of the same kind, and so secure attention; and, as Mr. Evans observes, "the more the system of attracting custom by notifications is practised, the more necessity there will be for practising it. . . . Multiply by any rule of progression the features that are offensive in the world to-day, and you will have the measure of the sort of world posterity will have to live in." Jones must have a larger poster than Brown; Robinson must have more glaring colours than Jones, and a more vulgarly sensational design, otherwise the very object of the campaign is defeated. The endeavour of each advertiser is, so to speak, to shout louder than any of the others.

This is bad enough in the town; even in towns which have not much architectural beauty to boast of. Mr. Evans puts this very well. A market, he observes, is not ugly, nor a dockyard. "There is a certain impressiveness about massive girders and light arches, about eager crowds and the equable remorseless force of the huge locomotive. Nothing, I maintain, need be displeasing to the eye that frankly subserves the real wants of everyday humanity." That is a sound and healthy sentiment, and shows that the author is no pining æsthetic, disgusted with modern life in general. The mischief of the huge posters, even in such places as streets and railway stations, is that they destroy scale (by the abnormal size of their lettering), they destroy breadth and repose of effect by their accumulation of tawdry colours having no relation to each other, and they are in nineteen cases out of twenty vulgar in style, because it is supposed that what is vulgar appeals most forcibly to the mind of the *vulgus*, the mass of persons. Mr. Evans indeed drops a hint that the crowd do not really desire vulgar and gaudy advertisements; that they only carelessly put up with them, and would on the whole rather have things beautiful

than ugly, if it were done for them without trouble. But to arrest their dull attention something startling must be used, and each advertiser tries to be more startling than his neighbours. And even where the advertisements are in themselves neatly designed and printed, and so far inoffensive, they become offensive through their very number and importunity. It is probable that the advertisers themselves would in many cases be thankful for the restraint of a law which would save them a large expenditure of money. As it is, one of them is obliged to placard himself because another does. A general prohibition would leave them all in much the same condition, with the saving of a good deal of money.

The disfigurement of the town is almost mild evil compared with the practice of this art in the country. Travel along the Great Western Railway from Paddington to Swindon, and you will find in every other field all along the route the alternating advertisements of two species of pills and a tooth powder. There is something so flagrant about this that one begins to think one is in a land of lunatics. Yet it is difficult to know how to apply legal restraint here. The farmers are offered a certain rent to allow these boards to be put up. If they chose to put up an erection of the same kind on their own land, on their own account, it would certainly be difficult to say on what principle they could be prevented from doing so, or why in that case they should not be allowed to let to others the right to do the same. The principle on which, as we gather, Mr. Evans would defend the prohibition is that people have no more right to annoy the sense of sight and the taste of their neighbours than they have to carry on a trade in such a manner as to be a nuisance to the public. While we entirely agree with this as a broad principle, we should fear there would be great practical difficulty in its application in a legal sense. The system of taxation of advertisements per square foot affords the best chance of reducing the evil without offending any principle of individual liberty. The system of boycotting tradesmen who offend by their advertisements—refusing to purchase articles so advertised—will not work, for a double reason; it would be almost impossible to secure united action on a large scale, and it would lead to the inconvenience of depriving ourselves of some

* "The Age of Disfigurement." By Richardson Evans. Remington & Co., London and Sydney: 1893.

things that are really useful; for it does not by any means follow that the articles most widely advertised are worthless, in spite of the old proverb that good wine needs no bush.

However, we advise all our readers who are interested in putting a check on the disfigurement of town and country by over-advertising (and they ought all to be) to read Mr. Evans's little book. They may have their eyes opened to some things which they have hitherto passed over unnoticed, as part of the inevitable conditions of life, and may learn to think that these mischiefs are not so inevitable, if rationally and systematically opposed, and they may get some valuable hints as to the best way of bringing about a reform. We may add that Mr. Evans's book contains, as an appendix, a statement as to the constitution and objects of the Society which has been formed for dealing with the subject.

ENGLISH ARCHITECTURAL DRAWINGS AT CHICAGO.

(BY AN AMERICAN CRITIC.)*

THE British exhibit of architectural drawings at the World's Columbian Exhibition at Chicago is at once interesting and disappointing to the American architect. It is interesting, because it forcibly reminds him that American architectural practice has long since swung away from the path English architecture is following, and illustrates in the most emphatic manner how widely different English architectural ideas, methods, and practices are from America. This is an object-lesson of no inconsiderable value, though it is a fact that scarcely requires illustration in the United States. Yet though one recognises at once the individuality of the British school—more individual, more national, more consistent, and, at times, perhaps, more uniform than the American school—one realises at the same time that the collection is sadly lacking in completeness, and that, notwithstanding it contains some notable examples both of design and of draughtsmanship, it is far from illustrating the present development of English architecture as a whole. The collection doubtless only follows the usual course of the average architectural exhibition. Yet the World's Columbian Exhibition called for more ambitious and dignified treatment than this. Not for the event only, but for the opportunity. There has been no exhibition of British architecture in America since that of the Philadelphia Centennial in 1876. In the seventeen years that have elapsed since then—seventeen years of enormous progress in American art, fine and industrial—American architecture has cut itself free from all British influence, almost from the possibility of British influence. Simple as this now seems to Americans, it amounted to nothing less than the reversal of the entire system of American practice that had been in vogue for the past two hundred years. It is true that much of the work done during this time was of the rudest description, and scarcely deserved the title of architecture, but it is, nevertheless, a fact that up to within twenty years ago America looked to England for its architectural models and inspirations. This has now passed away. The influence of the French academic school predominates in the United States to-day as entirely as it does in France, albeit leavened with an American freedom of interpretation and application that saves it from the cold formalism of much contemporary French work. Whether this movement is a development or a "fad," a growth or a fashion, we need not stop to inquire; but American architecture comes

very close to the point where the French school runs riot, and the influence of a more sober treatment might have been highly beneficial.

This influence might have been exerted, or at least suggested, by the British architects, had their collection of drawings been more complete, and had British architecture given evidence during, let us say, the last fifty years, of having manifested some elements of stability and certainty. But the English school has been quite as varied in its movements as the American in its worst days, though a varying amount of British character has tempered every British architectural revolution. But admitting this, a comprehensive exhibit of current British architecture could not but have acted as a check to the too close following of the French, which is now the greatest danger in American architecture. And herein is the great opportunity thrown away by the British architects, or, perhaps, not appreciated by them. Doubtless, the English architects did not aspire to teach their fellow-workers in America how to practise their art—they certainly could not have better expressed their indifference to American opinion than by the drawings sent—but they have done themselves harm in not estimating the importance of the Exhibition more seriously, and in not availing themselves more fully of the opportunity offered them.

English architecture has been characterised above as more consistent and more national than American. And this is because whatever the source from which the English architect obtains his ideas, he speedily envelops them in an unmistakably English dress. The United States has no historical precedent or guide of its own to set its style or impress its national traits upon its architecture. It is hardly necessary to say that England has all this, and that it is frankly shown in the drawings exhibited at Chicago. English architecture thus offers a striking contrast to American in illustrating a progress that, with many interruptions and vagaries, is nevertheless the outcome of centuries of work under conditions approximately similar. To the American, however it may appear to the Englishman, his transatlantic brother is essentially conservative. However it may have been in the past, it seems utterly impossible that any revival of architecture in England can succeed or obtain any sort of a vogue that is not English at heart or given a distinctly English form. Every foreign style that has thriven in England has early obtained a characteristic English form, and there is no reason to suppose this rule will be violated in any subsequent time.

This is, perhaps, scarcely the place to find an explanation for the excessively nationalistic character in British architecture, but it is a quality to wholly absent from contemporary American work—and necessarily absent, it should be remembered—that it is impossible for an American to overlook it. English architects are handling architectural motifs in a very marked and decidedly national manner, and the American cannot but notice this fact, and feel that, with it, he is standing before an architecture developed under conditions essentially different from his own.

And it is this difference of conditions which makes English architecture so successful, gives it its greatest value and its greatest interest to Americans. English architectural works are conceived and carried out on a totally different scale from that which obtains in America. The high office building, the commercial structure of from ten to eighteen stories, which may be found in every American city of importance, has not yet appeared in England. The one or two designs for blocks of business buildings shown at Chicago do not exceed five stories in height, including a ground floor and a gabled attic. The individual treatment of these designs will be touched on later; meanwhile it is sufficient to note that a method of architectural expression, which has not been more extensively

applied than this, is far from proving itself adaptable to the more complicated problems of construction and design which form the larger part of the work of the American architect.

More important, and much more satisfactory, is it to note the thoroughly admirable manner in which the English architects have assimilated their style to the smaller class of structures which form the bulk of every architect's work, and which in England satisfy every architectural and structural requirement. The ordinary conditions of life and business in England not necessitating structures of great height, nothing could be more satisfactory than much of the present English method of treatment, which is very well illustrated at Chicago by some drawings by Mr. T. G. Jackson. In buildings of a monumental type, or of a great height, American architects have nothing to learn from English work. Many of the problems coming under this head have already been partially solved by American architects in their own way, and certainly in a manner of their own that points the way for further progress in the same direction. And, indeed, judging by some examples in the present collection—and have I a right, on the present occasion, to go beyond the present collection at all for any purpose whatsoever?—it is not in the handling of large problems the English architect excels, but rather in smaller ones. One or two large churches are shown, for example, which are distinctly inferior to many less pretentious ones. Here, as in many another instance, it is the limits of the collection more than the lack of skill in the designer which makes this fact apparent, since it is impossible to believe that the designs for the Liverpool Cathedral, for example, represent the best that English architects can do in the designing of large churches. Yet, when it is recalled that many active architects in the United States will design and erect several buildings a year, costing from 50,000*l.* to 150,000*l.* each, and with as much ease and in a matter of course way as work averaging 5,000*l.* or 10,000*l.* each, the familiarity of American architects with large problems, the important place such work must hold in current American practice, marks an essential difference between English and American ideas and methods, a difference quite as distinct as the differences in the architectural expression employed by each.

Turning to the drawings themselves, the first questions that present themselves are—who was responsible for the collection, what were the methods adopted in forming it, and why was a large part of it sent at all? These are matters which are doubtless well known and understood in England; but to one seeing the drawings without any information on such fundamental points, they become matters of the greatest interest. American architects can justly take pride in being clearly ahead in the solution of their own problems, but however great may be the satisfaction they may feel in their own best work, they cannot regard their architectural exhibitions as things of unmixed delight. Is it possible, one cannot but ask, that the English care no more about architectural exhibitions than we do in America? Is the Architectural Room of the Royal Academy filled with no more respectable and representative drawings than cover the walls of our own Architectural League and Sketch Clubs? And is it, further, the thing in England, the drawings naturally suggest, to exhibit the oldest drawings obtainable, leaving the newer and better work for the architectural periodicals, or, perhaps, for some later exhibition a half-decade hence? Surely this must be one of the fine old English customs the untravelled American hears so much of, since, on the occasion of an international gathering, when each nation is striving to appear at its best, only the most approved ideas would be seen. Either this, certainly, or no winnowing process was adopted in forming the collection, for it is scarcely too much to say

* We have thought it would be of interest to our readers, to read the impression produced on an accomplished American artist by the English school of architectural drawings at Chicago. It is hardly necessary to say that in publishing our correspondent's criticism we do not in any way imply agreement with or adoption of his views.—ED.

at the bad and the very bad, the old and the indifferent, the poor and the insignificant predominate over the good and the worthy, which, indeed, are scarcely sufficiently prominent to make any impression at all.

Contenting ourselves, as needs we must, with what has been sent us, the drawings may be divided into those of archaeological and of present interest. The word archaeological is used as descriptive of drawings charged with an antiquity of their own—drawings, for example, of from fifteen to twenty years' standing or more, and which have no more proper place in an exhibition of current architecture, such as that at Chicago should properly be, than drawings of pre-Roman work in Britain. Yet a surprising number of these hoary examples are shown which have neither architectural value nor age—great though this latter element is in some instances—to give them interest. Ten years is certainly the longest term that should be permitted for any exhibition of current work, while it may be seriously questioned if anything older than five years should be shown. No limit, either of age or of merit, seems to have been thought of by English architects, while the committee of selection—if there really were such a body—appear to have decided that anything would do for America. Accordingly, we are shown a series of ancient drawings of interior decoration by Professor Aitchison, thoroughly uninteresting in design, and certainly very far from illustrating any present points of excellence in such work by contemporary English architects. If Professor Aitchison had nothing better to show than these, it would have been better to have sent nothing at all. Neither the catalogue nor the drawings are sufficiently explicit in explaining exactly what is represented in these pictures, but certainly the Arab Hall in Sir Frederick Leighton's house (No. 989) is not new, while a couple of drawing-rooms (Nos. 990, 991) lent by Sir Wilfrid Lawson, seem to belong to a past quite remote.

These drawings, and a series of small water-colours of rooms and decorations at every Hill, by Mr. Thomas W. Cutler (Nos. 1,033–1,044), are the chief examples the collection contains of interior decoration, and the show is very far from attaining to English workmanship and design. Mr. Cutler's work is, if anything, more disappointing than Professor Aitchison's, since it is later and is, apparently, one of the most important and costly pieces of such work in Great Britain. All these drawings are of small size, and totally inadequate for representing work of this nature, but they were doubtless deemed sufficient by their authors for illustrating their work. They certainly suggest nothing that would be improved by the use of a larger scale. Very much better things in the way of interior decoration are shown by several English firms in the Manufacturers' Building.

In this connexion, though differing from the previous drawings in subject and style, reference may be made to the decorated case of a grand pianoforte for Mr. Athelstan Riley, by Mr. T. G. Jackson (No. 1,073). This design has been repeatedly illustrated in the technical papers, but it is hard to understand on what grounds. The architect—perhaps artist would be a better term in this instance—has only slightly departed from the traditional forms of the piano case, and such variations as have been introduced are more interesting for their slight variation from current usages than for any inherent beauty or power of their own. Neither does the scrollwork with which the case is decorated call for special comment. It fills the space it has to occupy very well, but neither it nor the form of the case warrant the attention given this piece of furniture by the architectural press.

The drawings, it is proper to observe, as in the case with all the architectural drawings in the Exhibition, are hung without any arrangement or attempt at classification.

The English drawings are particularly badly arranged, since no attempt has been made at placing the work of the same architect together. The visitor looking for examples of particular types of buildings, or the work of individual architects, must review the whole collection before feeling assured everything has been seen. In this operation the most extraordinary drawings are constantly meeting one's eye, and it will be well, perhaps, if some of these are noted first. Thus, Mr. R. Phené Spiers exhibits two drawings, one, No. 7, Chelsea Embankment (No. 1,102), and the other a Mansion at Impney, in Worcester (No. 1,103), built, so the catalogue tells us, in association with M. E. Tronquin, of Paris. This drawing is dated 1876, and shows a very red house done in a very "École" manner. The block of town houses is likewise very red, though scarcely more interesting. Is it possible this gentleman has done no work during the past seventeen years? The designs are bad, the colouring is harsh and crude, and both bear evidence of fresh study in Paris, and that with bad results. That they are old is attested, not only by the dates on the drawings, but by their style. Why, then, were they sent to Chicago? It is impossible to believe they represent the best of this architect's work, and surely on this occasion only the best should be seen.

Of the same general character, quite as mystifying in its presence, and certainly as discreditable to its author, is a design, apparently once placed in competition for the new Town Hall at Manchester (No. 1,093), by Mr. J. Oldrid Scott. This is a huge and aged drawing, a relic of the Gothic revival in its worst stage. It is doubtful if anything like it, either in design or rendering, has ever been exhibited in America before; certainly not since the Philadelphia Centennial. Quite of the same class is the design for the new Town Hall at Hamburg by the late Sir G. G. Scott and Mr. J. Oldrid Scott (No. 1,092), which had much better have been retained in the author's collection of private antiquities than sent to Chicago for the delight and delectation of an awestricken and untutored public. It is a huge drawing of a huge edifice, utterly devoid of interest. The chief feature is a very bad tower that swells in the middle and tapers towards each end. What part Mr. Scott may have had in this work is impossible to determine from the drawing, but no greater injury could have been done to the memory of the late Sir G. G. Scott than to attach his name to a work of this description. However it may have been with the junior author, it is distinctly unrepresentative of the work of the senior. The discredit of sending such a drawing to America rests not alone upon its author, but upon the committee admitting it. Of this, as well as many another drawing, one continually asks, why is it here?

Turning to the drawings topically—for though this necessitates the separation of architects' individual work, it seems the better way to review the collection—the churches occupy the first place. The most pretentious are the drawings for Liverpool Cathedral by Mr. James Brooks (Nos. 1,017, 1,018). Though a fair attempt to design a modern cathedral, it is not successful. The junction of the nave with the towers is badly managed, while the spires sit on their bases without growing out of them. Much more successful, and, indeed, quite admirable in their way, are St. Mary's, Woolwich (No. 1,019), and St. Mary's, Hornsey (No. 1,020), both by the same architect. Both are very good examples of the English parish church. The former is an ambitious, consistent, Early English design, the latter a Decorated one. The Tower and Spire, Stoke Newington (No. 1,095), by Mr. J. Oldrid Scott, is a thoroughly English composition. It is an extremely good design, though much too large for the church behind it. But the architect was manifestly building a tower, and has done his work extremely well. Mr. Leonard Stokes exhibits an exterior and interior of his Corpus Christi Priory Church, Miles

Plattin, Manchester (Nos. 1,107, 1,108), a rather striking design of considerable merit. The interior is not so satisfactory as the exterior, the architect having apparently aimed at producing effect by mass and structure alone without the help of carved ornament, a system which might be successful if carried out on a large scale, but which is not at all suited to the dimensions of the present structure. The rendering of both these drawings is exceedingly clever. St. Clare's Church, Liverpool (No. 1,111), by the same architect, is a more interesting study. The grouping of the church and the connected buildings is very effective, but the absence of a tower, which would bring the whole into unity, is not compensated for by the small turret on one corner.

Mr. T. G. Jackson sends his New Campanile for the Cathedral of Zara, in Dalmatia (No. 1,070), a water-colour drawing indifferently done. This is a fairly successful design, the author having produced a structure that apparently harmonises with the edifice it decorates, and no greater success than this can be asked for. Mr. Jackson also exhibits a New Tower and Spire for St. John's Church, Wimbledon (No. 1,071), a fine design, somewhat marred by a break in the spire. Mr. Herbert A. Gribble shows two drawings of the Oratory Church, Brompton (Nos. 1,061 and 1,062), a large coloured drawing of the interior, and a pen-and-ink sketch of the Altar of St. Philip Neri. The latter is infinitely superior to the former as an example of draughtsmanship, and, though showing but a small part of the church, enables one to obtain a better idea of its architecture than the larger coloured drawing. No hint is given whether the colouring is in the materials, or painted, but however it is obtained there can be little satisfaction taken in it. The result is gaudy, and is carried out in a style no architect would think of adopting to-day. Whether our own work will appear as unsatisfactory as this ten years hence remains to be seen; meanwhile such drawings are useful in teaching what not to do again—a most important architectural lesson, by the way, though scarcely what the architect in the present instance hoped to impress. One of the most interesting drawings in the collection, though one of the smaller ones, and therefore less likely to attract attention, is Mr. J. Oldrid Scott's design for Lahore Cathedral (No. 1,094). This is an attempt to build a brick structure that will be ecclesiastically and architecturally effective—a most difficult problem at best. The architect has only made a partial success. He was not content, apparently, in seeking to adapt his structure to the material, but started out with a preconceived notion of what a church should be like if built of stone, and then did the best he could with brick. The result is not happy. The construction simulates stone while frankly expressing its brick nature, and instead of a well-thought-out, consistent design, we have a mixture of round and pointed arches and Gothic and brick construction. Had the architect frankly accepted his material and designed in it, or had he based his design on an Italian brick Gothic church, the result would have been much happier. But it is well-meant effort, and the author deserves credit for having done as well as he did with the difficult material. Mr. John J. Stevenson's St. Leonard's Church, Perth (No. 1,105), has some interesting features, but the design is spoilt by the doubling of the clearstory windows and by the open crown on the tower.

On the whole, the drawings of churches are very satisfactory. The larger designs—Liverpool Cathedral (Nos. 1,017, 1,018), St. Cotman's Cathedral, Queenstown, by Mr. George Ashlin (Nos. 1,003, 1,004), and the O'Connell Memorial Church, co. Kerry (Nos. 1,005, 1,006), by the same architect—are the least satisfactory, and are distinctly inferior to the designs for the Protestant Episcopal Cathedral in New York, shown in the American section. But the

English architects have thoroughly well availed themselves of the beautiful models for small churches which abound in their country, and which, in many respects, are the best models for small Gothic churches in the world. The smaller French churches have been so much injured by restorations and additions, and are usually so marred by grotesque interior decorations, as to render them of little value to the modern architect. But the English Mediaeval parish church is a thing of beauty even in this day of restoration, and the collection at Chicago shows how abundantly and how well English architects have gone to it for inspiration. The new Oratory Church, Brompton, is the only considerable ecclesiastical edifice shown not in the Gothic style, and the bulk of the drawings show, therefore, how extremely wise the British architects are in adhering to national traditions in this one class of buildings more closely than in any others. With the models at their hands, and in such infinite variety, it would be strange indeed if they neglected them. Mention should also be made of the fine drawings of the Cathedral of Truro, when completed (No. 1,084), and the North Transept of Westminster as now restored (No. 1,085), by Mr. John L. Pearson. They show the work of the scholarly English architect at his best, though they have not, of course, the interest that attaches to wholly original work. The value of these drawings for American eyes would have been greatly increased had photographs of the buildings, before the modern work was executed, been attached to them. The proposed English Church at Berne (No. 1,016), by Mr. Reginald Blomfield, is a meritorious design warranting attentive study.

Large public buildings are poorly represented in the collection, a somewhat singular fact, since, if few works of this nature are now in actual progress in England, some drawings or photographs of erected buildings would have been more acceptable than the old drawings of houses and town halls which have been sent. The most important structure of this class is unquestionably the design for the completion of the South Kensington Museum, by Messrs. Aston Webb and E. Ingress Bell (No. 1,009), shown in an exquisitely-drawn pen sketch by Mr. Raffles Davison. Notwithstanding the great beauty of this drawing, it is much too small to properly show so large a building. It is, in fact, only a sketch, very charming, it is true, but totally inadequate for the subject. The conditions under which this structure was designed, the questions of cost, of monumental and ornamental treatment, relationship to existing structures, and the like, were so numerous and so varied that it is difficult to criticise this design in a few words. A certain amount of decorative treatment was apparently deemed essential in a great public building like this, and such being the case, the authors have achieved a very considerable success. It is true the towers and domes with which the walls are broken will not add to the value of the building as a museum, but the funds being available, there is every reason why a museum building should, in the beauty of its architecture and the magnificence of its appointments, approximate in quality to that of its contents. But, after all, one has no right to comment on anything but the quality of this drawing, for it is, as has been said, much too small to show the design in detail, and as the architect has not thought it worth while to send a plan, one who sees this drawing for the first time is quite at a loss to imagine what sort of a structure is behind the façade. This is a serious misfortune, since no recent English design is more worthy of study and illustration.

Mr. John Belcher's (Nos. 1,011, 1,012), design for the same building is one of the most pretentious Classic designs in the English collection. As no plan accompanies the drawings it is even more difficult to criticise from the elevation than was Mr. Ashton Webb's perspective sketch. However, contenting ourselves with what has

been given us, the radical defect seems to be the absence of a dominating central feature. It is true the architect has made an attempt to gain some centralisation of effect by recessing his central portion and flanking it with two low towers crowned with domes—which are sufficiently pleasing in themselves. But there is a lack of climax in the centre not compensated for by the cleverness with which the pavilions at the ends of the recessed portions are managed. The most faulty part of the façade is the colonnade of the lower story, in which the height of the columns has been painfully exaggerated by placing them on high pedestals. In this connexion reference might be made to a water-colour drawing of Mr. Alfred A. Waterhouse's Natural History Museum, South Kensington (No. 1,123), which is dated 1876. It is difficult to understand the vogue this design appears to have enjoyed. The adjustment of the mass of the structure is well done, but the design itself lacks strength. The ornament and detail are poor and thin. Placed in contrast with Mr. Aston Webb's design it is chiefly interesting in illustrating how English architecture has broadened and developed since 1876.

Messrs. John Honeyman & Keppie send two drawings of a premiated design for the Glasgow Art Gallery (Nos. 1,064, 1,065). One of these is a scale elevation drawn to large size, and though of very ordinary design and rendering, is somewhat interesting as being the most conspicuous example of this sort of work in the collection. It is much to be regretted that the accepted design in this competition was not shown. Mr. E. R. Robson sends a drawing of his Royal Institute of Painters in Water Colours, Piccadilly, London (No. 1,091), a design of considerable interest, since it is a very good attempt to combine an art gallery with a series of shops on the lower floor. In a crowded city, where land and space are valuable, this is a thoroughly legitimate combination, and Mr. Robson has performed his task with much success. It is, of course, impossible that a building in which the upper floors show only an unbroken wall should wholly escape the impression of being top-heavy. But no other treatment is admissible if the structure is to fulfil the ends for which it is intended, while most excellent precedent exists for architecturally treating it. Still, Mr. Robson has not entirely escaped the fault of top-heaviness. Dr. R. Rowand Anderson's Scottish National Portrait Gallery, Edinburgh (No. 1,001) is very similar in idea, though carried out in a Gothic style. Though apparently successful as a building intended for a specific purpose, the design is not pleasing.

Municipal buildings, of which England contains a large number, are slightly represented, and chiefly by buildings of second and third-rate importance. Mr. Brightwen Binyon sends a view of his Town Hall for Sunderland (No. 1,013), a medium-sized structure designed in a bad Classic style and badly carried out. With the exception of the two antiquated designs of Mr. Scott, previously referred to, and a design of the Glasgow Municipal Buildings, by Mr. T. L. Watson (No. 1,127), this is the only building of its class exhibited, though the catalogue credits Mr. William Young with a drawing of the executed Municipal Buildings at Glasgow (No. 1,130). This, however, proves to be Gosford House, an English country seat of comparatively little interest. In this group might also be classed the Victoria Courts, Birmingham (No. 1,007), by Messrs. Aston Webb and Bell, a very fine drawing of which by Mr. Davison has been sent. The beauty of the drawing, in fact, rather obscures the individuality of the design. This structure is, on the whole, very pleasing, though somewhat hurt by the profusion of ornament applied to it.

In some respects, the drawings of Club-houses are the most interesting things in the English collection to American architects. English club-houses offer a striking contrast to American, in that while American archi-

itects keep to low structures, and endeavour to gain effect by spreading them out horizontally, the English appear to make clubs their highest buildings. Two or three such buildings are shown at Chicago. The absence of plans, which characterises the whole British collection, makes it almost impossible to understand these great structures, while their economy of plan and construction must necessarily remain sealed. The most notable of these buildings are by Col. R. W. Edis, who sends drawings of his Constitutional Club, Northumberland Avenue (No. 1,046), and the Junior Constitutional Club, Piccadilly (No. 1,047). Both are fine designs, very English in feeling, and, on the whole, very successful. In both, as well as in the few other high structures shown, the horizontal element predominates in the design, the architect, apparently, not knowing or understanding the value of the vertical element in designs of this description. Colonel Edis also exhibits a Convalescent Home and Hospital (No. 1,048), which is interesting as being one of the few utilitarian buildings in the collection. The design is extremely simple, as befits the subject. There was no necessity for exhibiting the construction arches over the windows of the second floor, and they quite fail to give the relief they were evidently intended to suggest. Mr. Waterhouse's National Liberal Club, Thames Embankment (No. 1,124), should also be mentioned as one of those designs which at once impress the American as being unhesitatingly and entirely English.

Few business blocks are shown, and those of so small a size as to be without interest to the American architect. No business structure of any importance is erected in America that does not afford accommodation for a large number of tenants; no better method of advertising one's success has been devised than erecting a gigantic office building, occupying a small portion of it, and renting out the remainder of the rooms to others, while gaining, at the same time, the advantage of occupying a large and imposing structure. This system has not yet reached England, and the conditions under which buildings are erected there, as well as the general system of doing business of this class, may prevent its ever being introduced. The most important drawing at Chicago is Messrs. Aston Webb and Bell's Metropolitan Life Assurance Society's Offices (No. 1,008). This is an extremely novel and successful design, though only four stories in height. The architects have taken advantage of their corner site by making a feature of an oriel window at this point, and have managed it extremely well. Whether the treatment here adopted would be suitable for a sixteen-story structure may well be questioned, but the style selected for this building is admirably suited to its height and dimensions, and the result is wholly satisfactory.

Of city and country houses we have a considerable variety. The city house is poorly represented, not a single drawing of note being shown. A drawing of 20, James-street, S.W., by Mr. Reginald Blomfield (No. 1014), is an ordinary design of little interest. Collingham Gardens Houses, S.W., by Messrs. Ernest George and Peto (No. 1,049), are interesting in design, as is also their "East Hill, Ramsgate" (No. 1,050), but these architects are not fairly represented at Chicago, though they have sent five drawings. Some of the country houses are finer as pictures than as architectural drawings, a conspicuous example being an "Architect's House," by Messrs. Goddard, Paget, & Goddard (No. 1,059). As a decorative water-colour, nothing could be better, the two ladies and the flower-beds making as fine a picture as one could wish to see. We may call this an architectural study, if we choose, but it is not right to dignify it with the title of an architectural drawing. Mr. Philip Henry Tree shows some pretty cottages (No. 1,117), and his Highland Mansions (Nos. 1,118, 1,119), of which two views are shown, are worthy of mention. More important is Mr.


Ralph Nevill's Snowdenham, Surrey (Nos. 1,079, 1,080), an extremely clever design, thoroughly English in composition. Mr. John J. Stevenson sends a water-colour drawing of "Kenhill," Norfolk (No. 1,106) much too large for the subject. A Scotch Mansion, by Mr. William Leiper (No. 1,074) is a fairly successful application of the French château style to the needs of a country house. Mr. T. L. Watson's design for the Royal Clyde Yacht Club, Hunter's Quay (No. 1,126) is a picturesque example of half-timbered work.

One feels reluctant to express an opinion on the state of English architecture from a collection, the chief examples of which have been noted in the course of this review. That it is not representative, as was stated at the outset, explains its deficiencies but does not excuse them. But however much dissatisfaction may be felt in the quality of the designs, as a whole, much praise may be given for the rendering employed in many of the drawings. It is by its pen-and-ink work the British collection is chiefly to be distinguished, and this, much more than the design, will be likely to attract the attention of the American architect. Drawings such as those by Mr. Raffles Davison are almost unknown in America, where the favourite style of rendering is by water-colour or in line drawing. There are few successful water-colour drawings in the British collection, though, doubtless, it would not be safe to argue American supremacy in that art from this circumstance. But water-colour as a medium for architectural drawing is too much used in America, where business buildings, and even unimportant structures, are submitted to clients in this medium. It is, therefore, with considerable satisfaction that one may study examples of pen-and-ink work in the British collection that are practically new to the majority of American draughtsmen, save as they have been made familiar with it through reproductions in the technical press. Mr. Davison's work is too well known in England to need more than a brief expression of appreciation of its exquisite finish and care. Beautiful as his work is, his drawings are executed on entirely too small a scale. An architectural drawing naturally requires to be large in order that all the parts may be seen. This is not the case with Mr. Davison's work, though it may be the result of a system rather than from his individual choice. The small size is admirably adapted to his style of rendering, though one naturally wishes the drawings had greater architectural value.

Even more striking are the shaded pen-and-ink drawings, illustrated in the new front of Brasenose College, in the High-street, Oxford (No. 1,069), new Examination Schools and Buildings for non-collegiate students, in the High-street of Oxford (No. 1,072), both by Mr. T. G. Jackson; the People's Palace, London (No. 1,087), and the Royal Institute of Painters in Water-Colours (No. 1,091), by Mr. E. R. Robson, and several other examples. These drawings are all too small for representing architectural subjects, and, indeed, this is a serious fault with all the British drawings—that and the absence of plans—and are more valuable as "reminders" or suggestions of the buildings than attempts to represent them architecturally. But the small size seems to have acted as an inducement to their authors to lavish the utmost care upon them. No one produces such drawings in America; and while they approximate to engravings in appearance—and it requires rather close examination, in some instances, to remove one's doubts—they almost make up, in their striking and great beauty, for the other deficiencies of the collection. It is doubtful if such a school of draughtsmanship would, under any circumstances, find any following in America. American architects are always in a hurry to get through with their work, and would hesitate to take the time and go to the expense necessary to produce such drawings as these. But they are extremely useful and interesting lessons

in pen-and-ink drawing, though one cannot rid oneself of the doubt that, notwithstanding the care lavished upon them, the trouble was scarcely worth the end. A broader, bolder style of rendering, carried out on a much larger scale, is what is needed in architectural drawing, but, in their way, these are the gems of the British collection, and it is a style of drawing in which the palm may be unhesitatingly awarded to the Englishman. F.

NOTES.

 E are glad to observe that the question of payment for water by meter and in proportion to the quantity used has been at all events mooted in the House of Commons by the question on the subject put by Mr. Wootton Isaacson on Tuesday last, "whether the Government would now bring in a Bill to compel water companies to charge by measurement the water used in all houses over 100^l. per annum." The limit named is absurdly high; "over 25^l." would be more suitable. The objection often raised to the idea of water-charging by meter is that the very poor would endeavour to do without water as much as possible, with insanitary results to themselves and others. A 25^l. limit ought to be sufficient to guard against this evil. Of course Mr. Fowler, like the Chancellor in Tennyson's poem, "Smiling put the question by," and it is probably premature at present to think of the formal adoption of the meter system; but it is as well that the idea should be kept before the legislature. We have little doubt that eventually we must come to the meter system, and it will be the best way of putting an end to the vexatious powers of interference and annoyance in regard to water fittings which are now conferred on the London Water Companies, and often so much abused by them.

THE next step in the coal dispute will be the taking of a ballot of the men on the following questions:—(1) Will you agree to a 25 per cent. reduction in wages or any part thereof? (2) Will you accept the employers' offer of arbitration? (3) Shall all men resume work who can do so at the old rate of wages? Unless the men still decline to accept any reduction whatever, the first of these questions requires two separate answers; and as it is always desirable that questions of this nature should be answerable simply in the affirmative or negative, it would have been better to have made two separate queries. We cannot but think, however, that a still wiser course would be to strike out the first question altogether, for in the event of the acceptance of the second, the situation would be so complicated that another ballot might be necessary before the difficulty could be cleared up. The distress among the strikers and their families is becoming so acute, and the funds from which the strike pay is drawn are so fast disappearing, that the question of partial resumption may now be more favourably considered. So many would be left out in the cold, however, and might therefore be still hostile, that it is by no means certain that the question will be answered in the affirmative. Even if it should be, no work could be done for another week or two, on account of the time occupied by taking the ballot.

THE Accademia dei Lincei are about to issue an archaeological plan of the whole City of Rome, which is to embody the results of past and present excavations. It seems almost inconceivable, but the fact remains that Canina's monumental work, issued in 1848, "Edificii di Roma Antica," is still, as a collective conspectus, unsurpassed. The new plan, "Forma urbis Romæ," was begun by its present editor, Professor Lanciani, in 1867, and was intended to

embody all the excavations and researches that had been set afoot in 1851. In 1876 Mommsen recommended that it should be published without further delay, but it happened that in that very year discoveries of such great importance were made that the publication was postponed indefinitely, as Lanciani had to give all his time and energies to the new material. In 1889 the Government discontinued its excavations, and as it seems unlikely that they will be re-opened for some considerable time, the Accademia determined to proceed at once with the map. It is to be on a scale of 1:1,000, to admit of the legible drawing of all details of construction, pavements, water-courses, &c. The map is to be divided into forty-six plates, forming collectively an area of 25 square metres; a synopsis of the forty-six plates, numbered and lettered, to show the *Regiones*, is, of course, appended. As to the material, it is intended to include monuments and ruins from the periods of the Kings, the Republic, the Emperors, Christian monuments down to the sixth century A.D., and those of modern Rome. These various periods are to be marked in five distinctive colours. Not only monuments at present existing, but those that have existed and have been destroyed, will be marked in, whenever authentic plans or descriptions exist; if descriptions only are extant, they will be given in dotted lines. No reconstructions, or restorations of any kind, however certain, are to be admitted. The subscription price is to be 7^l., and the publishers (Hoepli, of Milan) austere state that, owing to the cost of the book, there will be no free list whatever, even to the members of the Accademia.

WE are almost overdone now-a-days with books to illustrate ancient history and literature by monumental remains, but Dr. Lückenbach's *Abbildungen* (Illustrations) deserves the attention of English students, if for nothing else for the plan showing the position of the Parthenon marbles on the temple. The arrangement of the frieze has never been easy to visualise except when standing before a model, and many a provincial lecturer has been hard put to in trying to present it in easy form to his audience. Dr. Lückenbach's very simple diagram is quite new, and makes it all not only clear but obvious. We may note also the bird's-eye view of the Altis at Olympia, which, though perhaps purposely not very complete in detail, yet is an admirable aid to the historical imagination. The architectural part of the book owes much to Professor Durr, and to Dr. Hulsen, Second Secretary of the German Archaeological Institute at Rome.

THERE has been an unusual degree of architectural work going on in Zurich during the past year, both in regard to public buildings and domestic architecture. The suburban houses include some picturesque buildings; the new town houses are rather like copies of stereotyped Vienna or Berlin street fronts on a small scale, and looking very much out of place in this otherwise picturesque town. A block of flats by Herr Ernst, however, in red brick, shows a picturesque treatment which is not inappropriate to its title of "Red Castle buildings," and is, moreover, well planned internally. Of public buildings, the new Municipal Theatre, by the Viennese specialists, Messrs. Fellner & Helmer, has been only recently completed; and Herr Gustav Gull, of Zurich, has commenced the erection of a new National Museum which promises well, and is to be finished in an unusually short time, as it is to be presented to the Swiss Government by the city of Zurich in October, 1894. It will cost two million francs, and besides affording accommodation for the existing collections, will have a separate wing devoted to the purposes of an Arts and Crafts School. A new "Ton-Halle," or concert room building, has also been commenced under the super-

intendence of Herr Wehrli, from the design of Messrs. Fellner & Helmer; and a new General Post Office is to be taken in hand almost immediately, the necessary funds having been granted by the Government. Church building, it may be observed, takes a very small place amid this architectural activity, the only new example being the pretty Renaissance church with a campanile in the Enge suburb, from the designs of Professor Blunschi.

THE annual meeting of the delegates of the Amalgamated Societies of Architects and Civil Engineers of Germany will be held at Münster this month. Besides the Society's usual business a good deal of technical work is mapped out for the delegates. The smoke nuisance is to be discussed; an important publication on German building stones arranged for, and the results of numerous investigations with "fire-proof" materials put before the public. A publication on German country cottages is to be taken in hand; and the results of some investigations on the causes of the sweating of bricks prepared for print. The professional questions under discussion will embrace the revision of competition regulations, and the framing of contract-forms for the supply of iron-work. The official representatives of the societies who had to visit the Chicago Exhibition are expected to have some interesting reports ready for the meeting. The great biennial gathering of the members of the Societies will not take place until next year. Strasburg has been selected for the place of meeting.

SOME correspondence that has appeared in *Notes and Queries* shows what misapprehension is yet current concerning the houses in and about Lincoln's Inn-fields. For instance, the Rev. W. J. Loftie, F.S.A., author of many popular books about London, asks, as "interesting questions"—

What is the meaning of Whetstone-Park? Where was Little Lincoln's Inn-fields? Where was Lord Cobham hung in his armour over a slow fire? Where did William, Lord Russell, suffer?

and so on. Leaving his queries for the moment, we find that Mr. Loftie, in speaking of Arch- (or West-) row, along the west side, says, "the stone-faced house next door [to Powis, or Newcastle, House, Nos. 66 and 67] is undoubtedly by Inigo Jones." He may have authority for this, but the house No. 65 is in appearance later than Jones's original work here, which is mainly of red brick and now—excepting No. 2, Portsmouth-street, Lincoln's Inn-fields—chambers—succeeded over. He goes on: "The two brick pillars . . . really are before the stone-faced house." He refers to the two red-brick piers, of fine workmanship, each capped with a stone vase and ball, in front of Nos. 59 and 60, being Lindsey, and latterly Ancaster, House (built by Jones for Robert Bertie, Earl of Lindsey, 1640) which for many years past has borne a stuccoed front, with six Ionic pilasters, supporting a heavy cornice, and a balustrade from which the urns are lost. Nos. 57 and 58 is a stone house of later date, having a similar elevation, including the rustic ground floor, but with a rounded portico resting on Doric columns. No. 2, Portsmouth-street, marked in the Ordnance Survey of 1873 as the site of Portsmouth House, with Nos. 50 to 55, 61 and 64, retain their pristine elevations, but stuccoed, with plain or Ionic pilasters; and we notice that the rose and fleur-de-lis badges are banded on to the Ionic pilasters of only Nos. 2, 50-52, and 54.* They are cognisances of Henrietta Maria, the Rose and Lily Queen, and remind us that the land here, once known as Pursfield and the Fightells, was her jointure, and that it was to her that William Newton addressed his petition (1638) for licence to build along the Fields' north side. Opposed by the Benchers, Newton began and ended at the west end

of what was long called Holborn-row, completed by Newman in the succeeding reign. The brick fronts, in Arch-row, of Nos. 50A, 56, and 62, and all of No. 63 (stone) are modern. The archway beneath Nos. 54 and 55 marks an old way, Fortifue, or Fortifene, lane, between Ficquet's-fields and the Via de Aldwyche (Drury-lane). The pillage of the chapel of SS. Anselm and Cecilia, just beyond, by Protestant rioters on December 10, 1688, is commemorated by a silver medal struck by G. Bower, bearing on its reverse a view of the chapel in flames, and Arch-row. Faithorne's map shows the pathway hence to Great Turnstile, which path separated Pursfield (north-west) from the Cop or Cup-field (south-east). Whetstone-park, its west portion formerly Phillips's-rents, was built by William Whetstone, vestryman and overseer of St. Giles's circa 1650. He called it a park, perhaps because Sir Richard Weston had given the name of "Weston's park" to some ground, part of the Old Witch-close, attached to Lewkenor, olim Cornwallis, House, which adjoined the old "White Hart" at the north end of Drury-lane. It was a notorious quarter, lying along the old ditch called Spencer's dig. The supposed Manor-house, finally pulled down in 1886, and rebuilt as Nos. 16 and 17, Great Turnstile, and part of No. 283, High Holborn, is said to have been occupied by Richard Penderel, the Royalist.* New-square, Serle, Portugal, and Carey-streets, and New-court, stand on the site of Little Lincoln's Inn-fields, otherwise Ficquet's-fields, so styled in an agreement between Henry Serle and the Society of Lincoln's Inn, of 1682. Walsingham records Cobham was hung by the neck in an iron chain on a gallows built of purpose in St. Giles's-fields; that is, in Elm-close, between Seven-dials and Long-acre; in his "History of London" (1884), Mr. Loftie says Viscount Russell, "and, probably, Lord Cobham," were executed in Lincoln's Inn-fields.

IT is notified that, under the "Union of Benefices" Act, the remains of all persons interred in or under the church of All Hallows the Great will be removed in the course of next month, preparatory to the demolition of the church, the Ecclesiastical Commission making a maximum grant in aid of 10*l.* for each case. The tablets and monuments will also be taken, failing any other directions by interested parties, to St. Michael's, Paternoster Royal; which henceforth will serve for the united benefices. The demolition of this church, designed by Wren, and one of the eight in London so dedicated, will remove the last link of association between this quarter and the Hanse merchants of the Steelyard, whereof the site is now covered by the South-Eastern Railway terminus in Cannon-street. The church of All Hallows the Less—its benefice united to that of All Hallows the Great after the fire—stood a little eastwards, where is now the "City of London," formerly "Calvert's" Brewery. Of the latter church, and its handsome carved choir-screen, we gave a short account in a "Note" on July 5, 1890. In a letter to the *Times* of November 17, 1891, Mr. Lionel Cust gives a list of the portraits which Holbein painted in England, in 1523-3, of his patrons, the Steel-yard traders; to that time too are ascribed his two tempera pictures of "The Triumph of Riches" and "The Triumph of Poverty" painted for the Steel-yard Hall. His drawing is preserved, at Berlin, of the processional arch set up by the Hanse merchants here on the occasion of Anne Boleyn's progress from the Tower to Westminster on May 31, 1533.

THE journal of the Franklin Institute for August, among other papers contains a contribution dealing with the "Specific

* See the view of the old house and its carved wood chimney-piece, Early Jacobean, in Mr. W. Blott's "Chronicle of Blomundsbury" (1892), reviewed in the *Builder* of Nov. 5, 1892.

Heat of Metals," in the course of which it is stated that manganese has never been obtained free from silicon or carbon, either of which increases its specific heat; while aluminium has generally been used containing iron which decreases its specific heat. Hence the varying results by using specimens not perfectly pure. In the same journal we find some remarks upon the subject of "Causes of Fires," some of which are worth note. The writer urges that, as a precautionary measure, hanging lamps should be suspended from metal chains and not from cords, for should the fibres burn through, the lamp falls. Kerosene lamps should be filled in the daytime only. Never attempt to fill a lamp while it is burning or when near an artificial light or fire. No flame, be it gas or oil, should be nearer than 18 in. to bare woodwork at the sides and 36 in. from a ceiling. One of the first requirements, not only of civilised life, but also to secure immunity from fire is cleanliness. The fire hazard of any place increases with its untidiness. Chimney fires could be readily extinguished by throwing salt down the chimney, as gas is thereby evolved which extinguishes the fire, but in modern houses the roof is not generally easily accessible for this purpose.

THE parish church of St. Luke's, Chelsea, has been closed for alterations and repairs, to include the raising of the chancel floor and re-hanging of the bells. St. Luke's was built, of Bath stone, in the late Gothic style, after the designs of James Savage, in 1810-24, and has a groined stone roof. It is 187 ft. long, with a pinnacled tower 140 ft. high. James Northcote, R.A., painted the altar-piece, The Entombment, and Mr. Watts, R.A., a replica of his "Time, Death, and Judgment." The organ, by Nicholls and Gray, was enlarged by Jones. At that time Brompton was a favourite quarter of actors and singers; in St. Luke's churchyard were buried Egerton and Blanchard, who died in 1835. We understand that Miss A. Morgan will present a new pulpit, of marble and stone, in memory of her parents.

REFERRING to Scott's paintings of Old Westminster Bridge recently presented to the Guildhall Art Gallery, as we announced on the 26th ult., the *Athenaeum* of last week remarks:—"The picture being dated 1747, shows the bridge when nearly new." So much of Labaley's work as appears in each picture—the date 1747 is assigned to both—shows it in a finished state; but the bridge, its first pile driven in September, 1738, was not opened until November 18, 1750. At first meant to be wooden, and then constructed of magnesian limestone, the fabric gradually gave way, and large sums were spent in repairs. In 1846 they substituted a lower and balustraded parapet, removed the high canopies from the pier alcoves, and lowered the roadway, relieving the piers and their wooden caissons of, it is said, 30,000 tons weight. Sir Charles Barry proposed a five-arched bridge, of iron, in the Gothic style. Thomas Page's bridge was begun in 1854, on a tender for 201,000*l.*; the former cost (exclusive of the approaches) 17,000*l.* more. Our contemporary goes on to say—

"There is at Guildhall, included in the same gift, another picture by the same hand, of the bridge, several details of which are very interesting from the architect's and topographer's view."

The details are puzzling too, as we pointed out, whilst the title of one picture should accord with the view, which is southwards, and not "looking down the river."

IT seems a strange and unfortunate circumstance that Windsor, the site of one of our royal residences, should be continually coming before the public as a place noted for its insanitary condition. For years we have been hearing of the insanitary state of the dwellings of the poor

* Bays have been added to the first floors of No. 57 and 52.

there, which the energetic rector has done all in his power to ameliorate; and now we have a most unsatisfactory answer given in Parliament (Tuesday evening) in regard to the sanitary condition of the Cavalry Barracks there. In Mr. Campbell-Bannerman's reply to Sir W. Hart Dyke's question it was alleged that some of the smells in the barracks arose from dirty latrines and from escapes of gas. These are considerable evils in themselves, especially in a case where considerable numbers are crowded together in barracks. Sir W. Hart Dyke said "this was a matter of life and death," and pressed the question further—

"It is in the officers' quarters that the old and miserable drains terminate in a cesspool. Do the Government propose to put an end to the danger that arises from this system of drainage or to allow it to continue?"

Mr. CAMPBELL-BANNERMAN.—The whole system of drainage at the barracks in question is under consideration. The evil smells complained of are only perceived in the officers' quarters, and what can be done to put an end to them will be done at once."

We do not approve of the phrase "what can be done." Modern sanitary science is quite equal to making the whole thing right; it is only a question of money. The bad sanitation of places about Windsor is the more to be wondered at when we consider that the town is contiguous not only to a Royal Palace, but also to one of the largest public schools of England, in the vicinity of which it is especially desirable that no insanitary conditions should exist.

THE TRADES UNION CONGRESS.

THE twenty-sixth annual Trades Union Congress opened on Monday at Belfast, when Mr. Samuel Monro was elected President.

The Parliamentary Committee's report, presented by Mr. Charles Fenwick, M.P., contained the following passages:—

The Labour Department.

"This department of the Board of Trade was created by Mr. Mundella in 1886. The department, so far as the means at its disposal would permit, has done its work with great credit and efficiency, but the machinery at its command was totally inadequate having regard to the character and importance of the work to be performed. Through the assistance of the Chancellor of the Exchequer the President of the Board of Trade has now greatly extended the scope of its operations by the appointment of an efficient staff of local and general officers; and in order to facilitate the collection and distribution of statistical and other valuable information, so essential to be preserved in the history of an industrial community, a monthly journal, the *Labour Gazette*, is issued by the department free of charge to secretaries of trade societies and mechanics' institutes. Your committee express the hope that, with more efficient machinery, the department may be able to carry on with greater efficiency the economic education of a people whose national greatness depends upon their skill and industrial capacity, and we would suggest that the committee for the incoming year be instructed to consider how the *Gazette* may be improved, so that fuller statistical information might be obtained from employers."

Hours of Labour.

"The General Eight Hours Bill was introduced by Mr. John Burns, M.P., but in consequence of an unfavourable ballot he was unable to obtain a suitable date for its second reading. The Miners' Bill was more fortunate, a first place having been obtained on May 3, when Mr. Samuel Woods, M.P., moved the Second Reading, which was carried by a majority of seventy-eight votes, in a House composed of 480 Members. Your committee were in attendance in the lobby of the House, and rendered assistance to the committee of the Mines' Federation in canvassing the votes of Members in favour of the Bill. We sincerely regret that no opportunity has been afforded for making progress on the succeeding stages of this measure during the present Session, as the whole procedure will have to be repeated next Session, when the supporters of the Bill may not be quite so successful in the ballot as they were this year."

Employers' Liability.

"A Bill to amend the law of employers' liabilities was brought in by the Home Secretary, and afterwards referred to the Standing Committee on Law. Several important changes were made in the Bill in Committee, and if passed into law in its present form it would place a workman injured through the negligence of his employer or by the negligence of a fellow-workman, in a position of equality with a stranger or any person not in the employment of the said employers. The changes in the law advocated by the Congress for several years past are all embodied in this Bill, and your committee trust that every assistance will be given to the Government in their endeavours to pass the measure into law during the present year."

Strenuous efforts were made in the debate on the second reading of the Bill to induce the Government to accept the principle of providing compensation for all accidents, whether caused by negligence or otherwise. There is, we feel, a great deal to be said in favour of such a proposal, considered apart from the question of negligence, which is the principle upon which this measure is based; and it might well be provided for by separate legislation. It is, however, utterly impossible to deal satisfactorily with such a proposal in a Bill dealing with employers' liability for negligence.

We have had occasion previously to call your attention to the fact that in consequence of the Bill being referred to a Grand Committee, the Leader of the Opposition suggested to his followers that they should take no part in the proceedings of that Committee. That suggestion was faithfully observed by many of the Unionist Members, and it is now said that when the Bill is reported to the House an effort will be made to undo the work of the Grand Committee. It is contended that the voluntary associations, such as those which exist between the London & North-Western Railway Company and their servants, and other similar societies, will be destroyed if this Bill comes into law in its present form.

We do not believe that such results would follow from the passing of the Bill, but the principle of contracting out has been productive of such injustice to workmen that even if such predictions should prove to be well founded, we are bound in the interest of the workman to prevent, if possible, the continuation of a practice which experience has proved to be a source of oppression and injustice to thousands of unprotected men and women in our various industrial centres. The position of workmen employed by sub-contractors will require further consideration when the Report stage is reached, and we trust that the Government will either bring up themselves or accept from others an amendment to improve the Bill in this respect."

On Tuesday the Congress resumed its sitting.

The President's Address.

Mr. Monro, in the course of his Presidential Address, said he thought there was a special fitness in the Congress meeting this year in Belfast, a city which had taken a foremost place in the discussion of current events, and it was right and proper that those present, who in a great measure, by their vote and influence, held the destinies of Ireland in their hands, should, on the spot, study those social problems which were just now attracting so much attention. . . . The legislature had always been, and was ever likely to be, permeated by a thoroughly capitalist spirit. It was not necessary, nor would it be just, to assume that our capitalist legislators were studiously unfair, or that they consciously and for self-interest departed even a hair's breadth from what they honestly thought was best for the interest of the entire community. But it was not credible that any section of the community could completely divest itself of its own special modes of thought. A purely Labour Parliament would view such questions through an atmosphere coloured by its own prejudices, its own interests, its own habits of thought, and its own conditions of mind. It did not require proof that a Parliament in which employers of labour, large railway magnates, mining proprietors, and landlords wield such influence, should, even with the best intentions and the most scrupulous desire to be fair, occasionally deviate from the path which they would tread if they could completely enter into the lives of those for whom they so often legislate. In fact, the basis of their error consisted in ignoring the interests of other classes besides that to which they belonged, and taking the world as containing only one set of interests—

viz., that which embraced theirs. In treating this subject he was most anxious to avoid even the suggestion of bad faith or evil design; and the point which he desired to make and emphasise was the practical difficulty which arises in placing the relations between the State and our labouring population on a perfectly satisfactory basis by means of legislative machinery in which there existed an unconscious mental bias, caused partly by want of knowledge, partly by hereditary feeling, and other influences none the less potent because their existence was not always known even to the person swayed by them. Therefore he assumed that all our political parties were anxious to concede every reasonable demand to the party of Labour when it was made clear to them that such concessions would be beneficial to the true interests of Labour itself. But to secure this desirable result, in his opinion it was absolutely necessary that Labour should have a much larger proportion of representation in Parliament than it at present possessed, and that it was the duty of the State to provide the machinery by which that more equitable representation could be secured, either by the payment of members or some other scheme calculated to attain the end in view. And when that end was attained, it was to be hoped that Labour representatives would, irrespective of party, attend to Labour interests first, and party ties a long way afterwards. But there was another reason for the unwillingness of public men in the early part of this century to promote Labour legislation. The problems which engaged the attention of the politician and the reformer were not then nearly so troublesome or so numerous as now. People were apt to drop into the error of supposing that the conditions of and the relations between the various grades in the community were the same yesterday, to-day, and for ever. They forgot that the organisation of Labour as at present existing, as well as of capital, was of comparatively recent date. Most of the graver questions affecting Labour had grown more or less naturally out of the enormous extension of the organisation of industry, which in its turn was mainly the outcome of mechanical invention and the introduction of machinery. Production upon a large scale, coupled with agricultural depression, was followed by an influx of labour from the rural districts into the great towns. It was evident that the legislation applicable to the ways of an agricultural community was quite inapplicable to the new condition of things, where masses of human beings kept crowding and pushing each other out of existence for the divine privilege of living, and where overcrowding, poverty, and all their attendant evils made the labouring population easy victims to oppression and greed. Two hundred years ago there was not in the length or breadth of Great Britain such an institution as a factory in the modern sense of the term. The first English factory was not of an earlier date than 1719, and it was not till 1832 that the factory system was completely established. The new condition of things, brought about by unprecedented combinations of machinery, by improved appliances, by new forces of nature, and by a sudden development of what might be called free, as opposed to stationary labour, produced important results. The first consequence of this new freedom in Labour was highly disastrous to many of the workers themselves. Old methods were suddenly rendered useless; labour-saving machinery threw thousands out of employment; wages, in the crush and scramble for work, became greatly reduced, and, what was far worse, the health and tone of the workers was deteriorated by conditions of labour so appalling in their horror that up to the present day they caused a thrill of shame to the most hardened and unsympathetic. . . . The President having referred in this connexion to the history of factory legislation, &c., spoke as follows on the question of strikes: "My opinions as to strikes are well known, at least in Belfast. I believe it to be an act of criminal folly to hint at, or recommend, a strike until all the resources of civilisation have been exhausted in the endeavour to avoid such a forlorn hope; and I believe this opinion is very generally entertained among the better organised associations amongst us. In fact, lock-outs are more common in this part of the country than strikes are, showing that our motto—'Defence, not defiance'—is very generally acted on. I have great hope that one of the outcomes of the Royal Commission on Labour will be to formulate such a system of conciliation and arbitration as will make the resort to industrial warfare much more than it is at present. In matters of State, the American Legislature have endorsed the principle of arbitration, and more recently our own Govern-

ment have sympathised with the action of the Americans in this respect. May we not reasonably hope that in the near future differences of opinion in industrial matters as between employer and employed will be calmly discussed—first, between the parties concerned; and, if they are unable to see eye to eye on the subject, then that the matter in dispute should be referred to independent arbitrators uninterested as to the result, except in so far as seeing that fair play and justice should be meted out to either party? How much loss of capital, loss of trade, loss of wages, loss of temper, would be avoided by this course! How much misery, not only to the parties directly concerned, but to those dependent upon them, would be saved, if this rational mode of doing business were generally resorted to?

We will refer to some of the other proceedings of the Congress in our next.

PRIVATE STREET WORKS ACT, 1892.*

THERE is nothing perhaps which has given more work to the municipal engineer than the method of proceeding with regard to the repair and adoption of private streets introduced by the 150th and following sections of the Public Health Act, 1875; and nothing in that valuable Act has caused so much trouble to local authorities, or given rise to such peculiar and bewildering legal interpretations as these particular sections. The subject has already been considered at meetings of this Association, and the writer's apology for again referring to it is, that an altogether new method of proceeding has been introduced by the Private Street Works Act, 1892, which has recently become law. The object of this paper is to compare the procedure proposed by that Act with the routine of proceedings under the existing Acts, and to elicit the opinion of members of this Association, in whose practice the repair and adoption of private streets is a matter of frequent occurrence, upon each method of proceeding.

It is unnecessary to set forth in detail the steps to be taken under the respective Acts, inasmuch as members are intimately acquainted with them, and the writer will content himself with enumerating what appears to him to be the advantages and the possible disadvantages which the Act of 1892 offers to local authorities when compared with the working of the Acts previously in force.

By Section 6 of the new Act, every street, or part of a street, is not sewered, levelled, paved, metalled, flagged, channelled, made good, and lighted to the satisfaction of the local authority, the authority may resolve to do any one or more of these things, and the expense incurred in executing the work shall be apportioned on the frontages to such street. This is clearly a great improvement on the provisions of the previous Acts, which give to the frontage owners, after receiving notice, the option of doing the work themselves. In the majority of cases, it is true, the owners do not avail themselves of this privilege, and the work is usually done by the authority; but every owner has the right to do the work throughout his own frontage himself, and if one or more claim to exercise this right, a great difficulty is placed in the way of executing the work in a satisfactory manner. In such a case the authority has to make arrangements for repairing those parts of the street where the frontage owners take no action, and this is sometimes a very inconvenient and unsatisfactory thing to do. Can anything more confusing be conceived, than a number of owners employing their own respective contractors or workmen to carry out the work for their own particular frontages, in accordance with the notice and plans prepared by the authority's surveyor for the whole street? In one case in the writer's experience about one-half the owners elected to do the work themselves, and the remainder left it to the local authority. The authority entered into a contract for the repair of the parts left to them, and the other owners arranged with the same contractor to do the work to their frontages, to the satisfaction of the authority, at a fixed price per foot frontage. Certain extras were incurred in the execution of the work, for the whole of which extras the authority had to pay the contractor. A proportion of these was charged to and received from the frontage owners for whom the authority acted, but the remaining portion could not be recovered by the authority from the owners who acted for themselves. In another case, in an adjoining district, the owners all

carried out the work themselves, each independently of the others, with a result which is more easily imagined than described. The possibility of all such confusion as this, and of one or two owners obstructing the necessary work of repair in a private street, is avoided by the method of proceeding proposed by the new Act.

The notice to be given to the owners under the present system of procedure requires great care in its preparation, and many sums have been lost to local authorities by reason of the faulty drafting of notices or the defective service thereof. The simple plan of publishing in the local papers the resolution of the authority to proceed with the work, affixing copies of such resolutions in the street to be repaired, and serving similar copies on the owners as proposed by the new Act, is certainly much better and simpler.

From the service of notice to repair, as now given, until the demand for payment of apportionment is made, a considerable length of time must of necessity elapse, and it is not until then that the local authority becomes aware of the difficulty in recovering the moneys expended on the street. Objections and excuses of various kinds are made by some of the frontage owners, and the payments have to be deferred or spread over a number of years. All this time the Private Streets account is overdrawn, and interest has to be paid to the bank, or a loan obtained by the local authority. Much of this inconvenience and expense will be avoided by the preparation of the provisional apportionment under the new Act, before the work is begun, thereby letting the owners know the amounts they will have to pay, and giving them the opportunity of preparing to meet these demands when due. The new Act also provides for the recovery of these amounts in a more effectual manner, by making them charges on the properties, and giving the local authorities the powers of mortgages and of appointing a receiver. It at the same time gives the owners every reasonable opportunity of investigating the amounts charged, and gives them all reasonable facilities for payment of same.

Sometimes, under the present system, it is necessary to obtain a loan for Private Street Works, but in apportioning the cost on the owners it does not appear that the amount paid by the local authority for interest can be charged in such apportionments, and although this may not be done under the new Act, yet the provisions contained in Sections 13 and 14, allowing interest at 4 per cent. per annum to be charged from the date of the final apportionment, and permitting certain charges to be made for inspection and copies of register, help to some extent to recoup the local authority for payments made as interest on loan for private street works.

The provision in Section 9 also, which allows 5 per cent. for establishment charges, appears to be only a fair recompense to the local authority for expenses incurred in connexion with private street works. The legal right to make such a charge has hitherto been somewhat doubtful.

There are always two sides to a question, and the frontage owner's views on the question of repairing a private street are not, under the present procedure, fully and fairly considered until proceedings have been taken against him for the recovery of the amount of his apportionment. It is true he may petition the local authority, or state his objections to the authority's officials, and although such representations always receive the greatest possible consideration, yet it cannot be contended that a judicial or impartial investigation of the matter is made until some time after the work of repair has been done. There may be circumstances in connexion with a particular street which, if known to the local authority, would influence or guide them in the matter of its repair, and these circumstances may be kept from them until the work has been done and they are proceeding for the recovery of the money, and then, when, too late, all the facts become known, the authority find to their loss that they have made a mistake. If, through any oversight or inadvertence, an error is made as to the proper person or persons liable for the repair of the street, in the preparation or service of the notices, in respect to the plans or the apportionment, or in any matter or thing relating to the work, or to the several steps to be taken under the present system, there is no opportunity to rectify the same, and it is not until the effort is made to recover the apportionments that such error is pointed out, and the authority fails in its claim to recover part or the whole of the money which has already been expended on the repair of a private street. Unfortunately also it often

happens that a further useless expenditure is made in law costs in endeavouring to recover these amounts.

The method of proceeding proposed by the new Act is very simple, and likely to prevent much unnecessary trouble and litigation. It simply consists in preparing a provisional apportionment of the estimated expenses, together with plans, sections, specification, and estimate of the work proposed to be done in a new street, and, after these have been approved of by the local authority, and the resolution of the authority to do the work published in the prescribed manner, depositing such apportionment, plans, &c., for inspection for one month at the offices of the authority. An opportunity is given to the owners during that month to make objection, by written notice to the authority, to the proposed work, on the broad grounds which are set out in the Act, and which include all those things that under the present system may cause litigation, and this appears to be a just and wise arrangement, and one likely to be beneficial both to local authorities and to persons interested in property in private streets. The submission of any objections which may have been made by the owners to a court of summary jurisdiction, on the application of the authority, and the power given to such court to settle all matters in dispute between the objectors and the authority in relation to the proposed works, appears to be a fair and equitable way of settling the matter; but the right granted to the court to revise the proceedings of the local authority and to amend the plans, estimates, and apportionments, seems rather to be open to objection as an unwarrantable interference with the rights and duties of local authorities, and a retrograde step in the matter of local government.

The court may direct that expenses incurred by the authority in relation to objections under the Act shall be paid by the objectors, and, if paid by the authority in the first instance, may be charged as part of the cost of the works on the premises of the objectors. This gives increased security to the authority for recovery of costs to which they are often needlessly put by frontage owners.

Under Section 152 of the Public Health Act, 1875, as interpreted in the West Ham case, a local authority could not declare a private street to be a highway repairable by the inhabitants at large until all the requirements set out in that section had been carried out, but as it was practically impossible to do all these things in the same street, this absurd legal decision has been repealed by Section 41 of the Public Health Amendment Act, 1890. It does not, however, appear that under either of these Acts a local authority could take over a street unless with the consent of a majority of the frontage owners therein. By Section 19 of the new Act, when any or all of the works enumerated in the Act are carried out, the local authority, if it thinks fit, may declare the street or part of a street to be a highway repairable by the inhabitants at large, and by Section 15 the authority may pay, out of the district rate, the whole or any portion of the expenses of private street works. Thus the new Act gives local authorities the fullest possible discretion in the matter of adopting private streets, and gives very important additional powers in enabling them to take over a private street with or without the consent of the frontage owners. Whether this is desirable or not may be a matter for dispute, but there is no doubt that in many instances great public inconvenience has been caused by the action of private owners, in preventing the adoption of certain streets and squares which would be desirable thoroughfares.

By Section 20 of the new Act, when a private street has been made up, the local authorities are bound, on the application of the owners of the greatest part in value thereof, to declare the same a public highway, thus enabling a simple majority in value of the owners to obtain relief from further expenses of repair.

Under the present system of working a local authority cannot recover the cost of work done in the repair of a private street necessary to bring the sewerage, drainage, or level of that street into conformity with adjoining streets, and the power to do this is one of the most valuable provisions of the new Act.

In the case of Bonella v. Twickenham Local Board it was held that although a local authority may not have approved of the sewage of a private street, and may have carefully refrained from exercising any control over the sewer in such street, the fact of permitting such sewer to exist, without taking action with regard thereto within a reasonable time, made it a public sewer, and it became vested in the authority under Section 13

* Being a paper read before the Incorporated Association of Municipal and County Engineers, by Mr. G. B. Laifan, Assoc. M. Inst. C.E., at the recent meeting at West Bromwich.

of the Act. It could not, therefore, be contended that such street was not sewered to the satisfaction of the authority, and the authority were wrong in including in the apportionment of private street works the cost of a new sewer for such street.

Section 9 of the Act under consideration practically destroys the effect of this decision, as it enables the authority to include in the works to be done in a private street any works which they think necessary to bring the street, as regards its sewerage, into conformity with adjoining streets, and in most cases where the existing sewer is not satisfactory, this can only be done by constructing a new sewer in connexion with the system of sewerage of the district.

This section also empowers the authority to include surface water sewers in private street works, and this appears to be the first instance in which any legislative provision has been made for the construction of separate sewers or drains for the reception of surface water. It is a curious fact that such sewers have not hitherto been even mentioned in the Public Health Acts.

Under the old Act the principle to be adopted in making the apportionment was based on frontage only, and left, subject to certain decisions on the point, to the authority's surveyor; but the new Act relieves him from this responsibility and puts it on the local authority, giving them power to decide whether the apportionment is to be made according to the frontage only, or to take into account, if they should think fit, the degree of benefit derived by any premises, and the amount of work already done by any of the owners. This is the most dangerous thing in the Act, and may cause endless difficulties to the local authority. In one district where the Act has been adopted, a committee spent weeks endeavouring to decide the proper proportion of the charges to be made between flank and other frontages, at each meeting revising or reversing the decision previously arrived at, and ultimately leaving the point no nearer a satisfactory solution than when they first took it up. There is only one principle on which the apportionment can be made, and that is the one of frontage, as heretofore, and local authorities will not find the new Act to work well unless they adhere to this principle. The Act itself says the apportionment shall be according to the frontage unless the authority otherwise resolve, and if they resolve nothing there will be no trouble on this point.

The amount of work already done by any of the owners might perhaps be fairly taken into account, to the extent of giving credit for any materials fit to be re-used, but it is very difficult where to draw the line if this principle be admitted.

Section 10 also gives the authority power to include in the apportionment any premises which do not abut or adjoin the street, but which have access thereto through a court or passage, and which in their opinion will be benefited by the work, and to fix the sum or proportion to be charged against such premises. The authority will have very great difficulty in fixing a proportion likely to give satisfaction, and in this case also they had much better resolve not to do it.

Section 22, which exempts a railway or canal company from payment of any part of the cost of repair of a private street, on which the premises of the company front or abut, provided it has no direct communication with such street, and makes the remaining frontages liable for this apportionment until such time as the company may make a communication, when it is to be recovered from the company by the authority and divided between the other owners, is a very curious one, and likely to be very difficult and impracticable in carrying out.

The interpretation clause in the new Act, which defines paving, metalling, and flagging as including macadamising, asphaltising, gravelling, kerbing, and every method of making a carriage-way or footway, will remove much ambiguity which has been caused by these terms as used in the previous Acts.

The powers granted by the new Act to local authorities to amend at any time the specifications, plans, sections, estimate, and provisional apportionment of proposed street works, and to exceed the estimated cost by not more than 15 per cent., are right and reasonable, and the opportunity given to the owners to dispute the final apportionment on certain limited grounds is reasonable and fair, but the provisions for such frequent reference to the court of summary jurisdiction is likely to make the Act a busy one for lawyers. And this facility for litigation appears to the writer to be the greatest objection that can be made to the method of proceeding proposed by the new Act.

If the discussion, which it is hoped these observations on the Private Street Works Act, 1892, will produce, be of any service in assisting Members of this Association, who may be called upon to advise their authorities on the desirability of adopting the Act, to form an opinion on the question, the object of this paper will be attained.

LEICESTER STORM OUTFALL WORKS:

INSPECTION OF THE NEW CULVERTS, &c., BY THE MEMBERS OF THE TOWN COUNCIL.

ON Thursday last week, by the invitation of Mr. Alderman Swain, the Chairman of the Highway and Sewerage Committee, the members of the Leicester Town Council, the magistrates and the borough officials, numbering between seventy and eighty, paid a formal visit of inspection to the storm outfall works, now rapidly approaching completion, over which they were conducted by the Borough Engineer, Mr. E. G. Mawbey, C.E.

The party drove from the Town Hall to a point about half-a-mile from the outfall, where an improvised train with locomotive attached was in readiness. They were conveyed to the outfall on the bank of the river, where they inspected a length of the culvert, which was brilliantly illuminated, as was also the tunnel and the greater portion of the length of the works afterwards inspected. They then rode back some distance over the line of the culvert to the commencement of the tunnel, which is about 1,200 yds. long, where they entered and walked through it for a distance of about 450 yds. They journeyed partly by the contractor's tram and partly through the illuminated culvert for a total distance of about three and a-half miles to the pumping station.

At the Leicester end they emerged from the culvert into the storm overflow chamber, which is 110 ft. long by 25 ft. wide, and rises in semi-circular arches to a height of about 12 ft. 6 in. In this chamber luncheon was served, and after the loyal toasts, Alderman Sir Thomas Wright, proposed the health of the Chairman, and Alderman Swain, in responding, gave a description of the work as designed by the present Borough Engineer, Mr. Mawbey. It was stated that the object of this culvert was to remedy the back watering and cellar flooding by carrying off to the river the overflow from the sewers when the rainfall increased the volume to such proportions that it becomes unnecessary to pump it on to the Sewage Farm.

The scheme consists chiefly of about 4½ miles of storm culverts, viz.: a 6 ft. 9 in. by 4 ft. 6 in. supplementary culvert, with two additional lines of 5 ft. iron pipes under the canal and river above the pumping station, the large storm overflow chamber, before referred to, and about 3½ miles of culvert 8 ft. in diameter, partly in open trench work and partly in tunnel to a point in the Valley of the Soar, where a free outfall for the storm waters of the town can be obtained above the level of the surface of the river.

The culvert is capable of discharging seventy million gallons of water in twenty-four hours.

The accepted tenders amount to 71,446l., bringing, including Mr. Gordon's schemes, the total expenditure upon new sewerage and sewage outfall disposal works up to over 300,000l.

The work, which is now in progress, is expected to be completed in about two months' time.

MAGAZINES AND REVIEWS.*

In the *Art Journal* Lady Colin Campbell makes a new point in an article on "Indoor Venice" with some illustrations of Venetian interiors as now existing, old Renaissance rooms furnished in partly ancient and partly modern taste. It is true that we know and think far more of the exteriors than the interiors of Venice, and though in this case the value of the article lies almost entirely in the illustrations, it serves as a reminder of a field of interest in Venice which has been rather overlooked. Otherwise the number is not a very interesting one, and it was hardly worth while to recur to the subject of Walker's "Harbour of Refuge" to give so poor an illustration of it.

The *Fortnightly* publishes an article of some interest by Major Martin Hume on "A Palace in the Strand," "Durham Place" to wit, which once

* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

stood on a portion of what is now the Adelphi region, and on the various histories connected with it. Mr. Conway's paper on "Climbing High Mountains" is of some practical interest.

The *Nineteenth Century* publishes Professor Michael Foster's "Rede Lecture" on "Weariness," a scientific analysis of a subject in which all hard-worked people have a practical interest. Mr. Northcote's "American Life through English Spectacles" is an attempt to correct some popular misapprehensions of Englishmen about America and Americans, and is a very pleasantly-written article. The Countess of Jersey undertakes the same office by another country in her article on "The Transformation of Japan." "A Question of Taste," by Mr. E. F. Benson, deals mainly with literary subjects, but has its bearing on Art also.

A very good and well illustrated article on "Clothes" is contributed to *Scribner* by Mr. E. T. Lowell, who treats the subject in a manner which is far from commonplace, going into general principles, especially as to the great question of drapery, or "shaped clothes" and their relative merits (the merits of the latter being practical only), and the essential distinction between clothes that define the figure and those that distort it. Miss Edith Wharton contributes a couple of sonnets on "Chartres"—verses just good enough for a magazine; and Mr. F. J. Miller contributes a very good article on "The Machinist" (one of a series on "Man's Occupations"), with illustrations by Mr. Otto H. Bacher.

In *Harper's Magazine*, Mr. and Mrs. Pennell relate with pencil and pen the discovery of another picturesque and little-known town, "an Albert Dürer town," but this time they consent to give it a local habitation and a name, "Rocamadour," a little town only to be reached by taking the slowest of slow trains between Limoges and Toulouse. Some of the sketches entirely and remarkably bear out its claim to be called an Albert Dürer town. An illustrated article on "Texas" is contributed by Mr. S. B. Maxey; among the illustrations, a picturesque building called the Alamo, curiously redolent of Spanish influence.

The *New Review* commences with a blatant article on "The Coal War," by Mr. S. Woods, M.P., an out and out defence of the strikers and abuse of those who have declined to strike; an article on which recent events furnish a very pretty comment. Mr. St. John Hope writes an article, which is of course well informed and to the point, on "Silchester and Its Story," giving a short account of the history and present state of the exploration work at Silchester.

The *Pall Mall Magazine* continues the illustrations of "The Follies of Fashion" from old prints, and under the title "A Dutch Exterior" gives an article by Mr. W. L. Alden on Rotterdam, with some good sketches. Under the title "An Imperial City" Sir Lepel Griffin, with the assistance of illustrations by Mr. H. W. Brewer and Mr. Masey, suggests new possibilities for the architectural improvement of London. The sketch of "Tratfalgar-square as it might be" seems a little too fidgety and wanting in breadth and repose; "Parliament-square as it might be" is better, and the suggestion for carrying the line of Portland-place, as "Portland-avenue," straight through the centre of the gardens north of the Crescent and on into the Broad Walk of Regent's Park, is a really good one and easily feasible. We may add that it is only an old suggestion revived.

In the *English Illustrated* we again come on the subject of clothes in a short article, by Mr. Henry Holiday on "How Men Dress," with a telling contrast between a group dressed in the style of the day of Pinturicchio and a similarly posed group in the costume of the present day. A better point is made in a comparison of the Apollo Belvedere, first with a man in the ordinary gentleman's dress of to-day, posed in the same attitude, and secondly with a man in a dress which, as the author remarks, "anyone might wear in the country now," with knee-breeches, a tunic, and a low hat; the legs of this latter figure are surely too long, but the point is well illustrated otherwise. There are, however, two sides to the whole question: a dress contrary to the custom of the day and arbitrarily adopted for the sake of artistic effect would after all be open to the same kind of charge as a restoration of ancient architectural styles; there would be a self-consciousness about it which would go far to nullify its effect.

The *Newbery House Magazine* includes among its contents a short article on the "Dead Cities of Flanders," by Mme. Goey; one by Mr. G.

Wakeling on "Sir John Gilbert and the *London Journal*," accompanied by reprints from some of his old illustrations done for that publication—and very delightfully old-fashioned some of them look; and a sketch of "The Fortunes of Lambeth Palace," historical rather than architectural, by Mr. W. C. Sydney.

The *Strand* (August) gives as its "Illustrated Interview" a description and illustrations of the house of Mr. Luke Fildes, which may interest those who like small talk about artists and their surroundings. We have no sympathy with this fashion of making private homes public, but we presume it is attractive to a certain number of readers, or it would not be done. The wonder to us is that the subjects of this kind of operation are willing to allow it.

The *Idler* gives a popular account of Mont St. Michel, with sketches by Mr. C. O. Murray.

The *Studio* has been having a competition for a title page, and prints reductions of a number of the designs, some of which are very pretty, with critical remarks. The number opens with an article on "Sketching from Nature" by Mr. Alfred Hartley, with a series of most interesting facsimile sketches by Mr. Henry Moore and other eminent artists; "The Sketchbook in the Street" by Mr. Draper is another good article, and there is an interview with Mr. Frederick Hollyer, with some reproductions from his photographs. The whole number is a very good and interesting one.

The *Antiquary* contains, besides the several articles on various subjects, an article on "The Discovery of Wall Paintings at Clayton Church, Brighton," by Mr. J. L. André, and one on "Recent Exploration in Upper Wharfedale, by Mr. Ernest S. Speight.

Illustrations.

ROSEHAUGH MANSION.

THE work now being carried out consists of considerable additions to an existing house, in the form of new hall, drawing-room, billiard and smoking rooms, &c., on the ground-floor, with swimming pond and complete arrangements for Turkish bath in the basement, and the entire re-modelling and casing of the old house. In addition to the alterations, considerable works have been carried out on the estate by the present proprietor of Rosehaugh, who is one of the most progressive and enlightened of the younger landlords of the North. These include such work as the creation of a lake, the water-power obtained from which by means of turbine machinery supplies the power for electric lighting of the mansion and estate buildings.

The details of the work have been very much improved from those shown upon the published drawing, during the course of execution, and while showing certain similarity in style and treatment to English work of the sixteenth century, much of the detail is French in character, as much of the old Scotch work of this period shows distinct evidence of French influence.

WM. FLOCKHART.

MISSION HALL, WHITECHAPEL.

THIS is an adaptation and addition to the St. Andrew's Presbyterian church, Philpot-street, Whitechapel, for the purposes of the medical and other work of the Midway Mission to the Jews. Meeting rooms are provided on the ground floor, the other part, together with a new story, being adapted for mission purposes, together with a house erected on the north side. Large waiting and reading-rooms are provided in the basement for the use of patients.

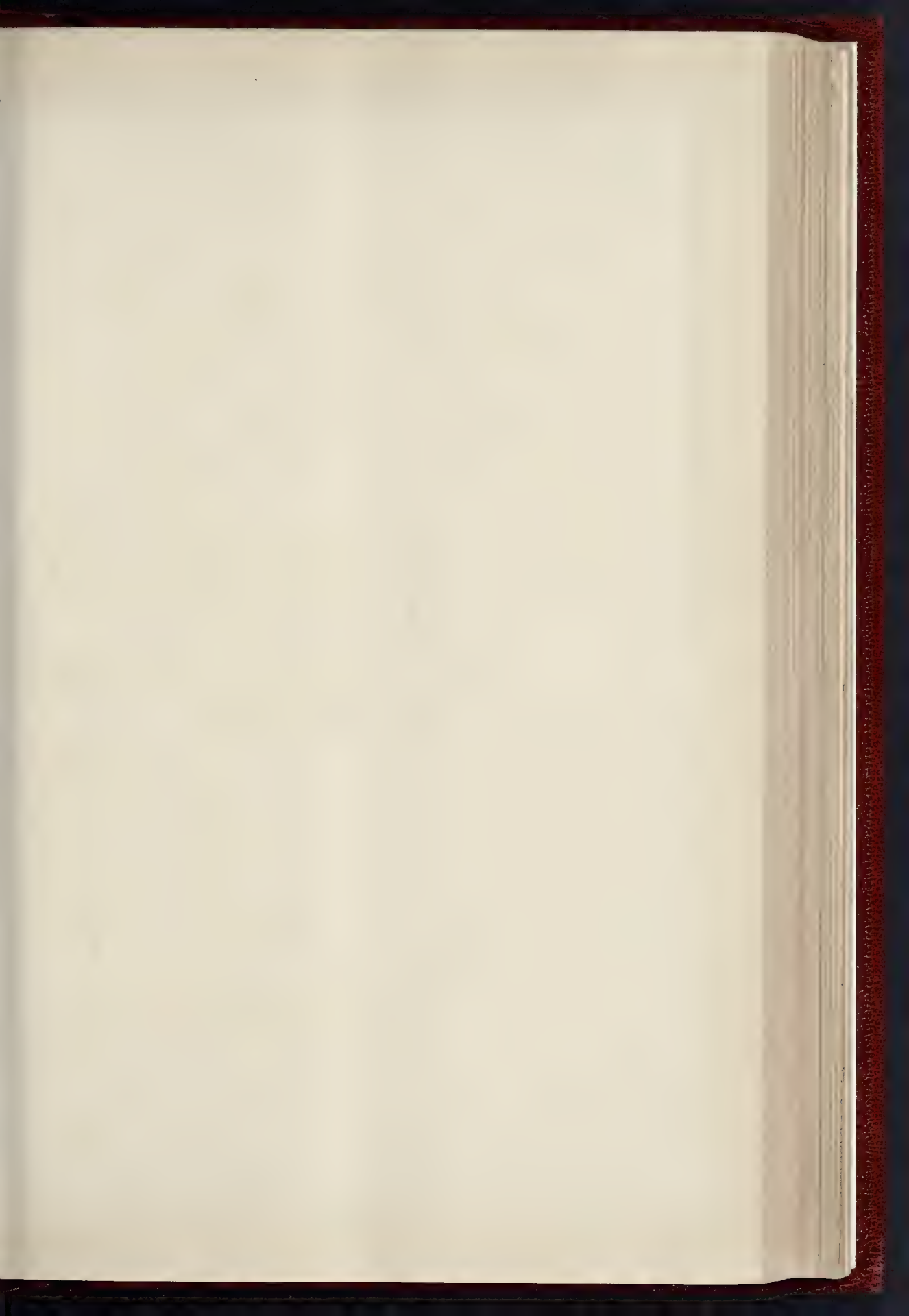
The architects are Messrs. Alfred R. Pite & Son, of Bloomsbury.

The drawing from which our illustration is taken was exhibited in this year's Royal Academy exhibition.

HOMOEOPATHIC HOSPITAL, GREAT ORMOND-STREET.

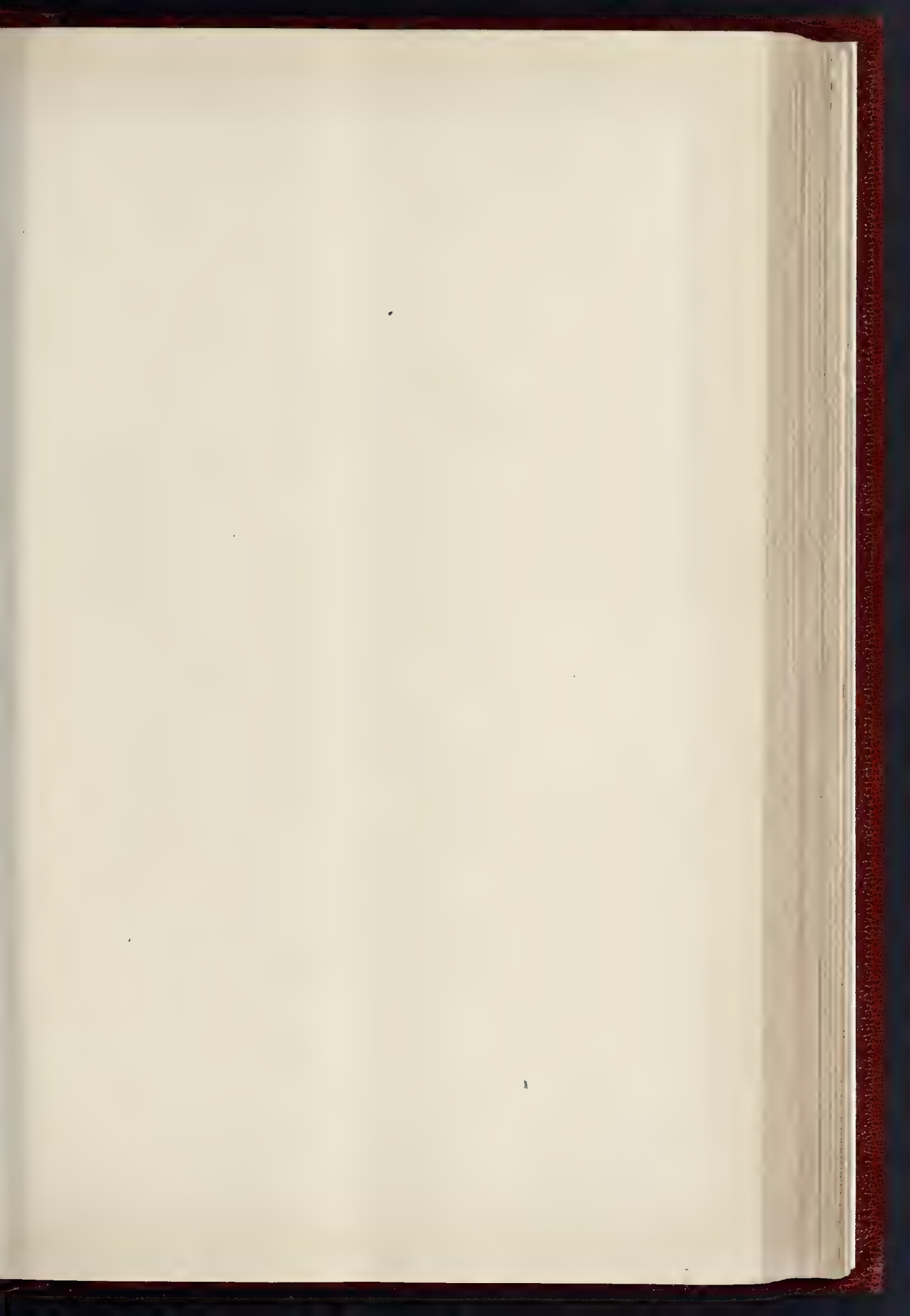
THIS is the preliminary sketch design for the new Homoeopathic Hospital, the first stone of which was laid by H.R.H. the Duchess of Teck last June. The first portion of the building, which is now about to be erected, is arranged in disconnected blocks, and will contain ninety beds. An out-patient department is placed in the basement, with no atmospheric communication with



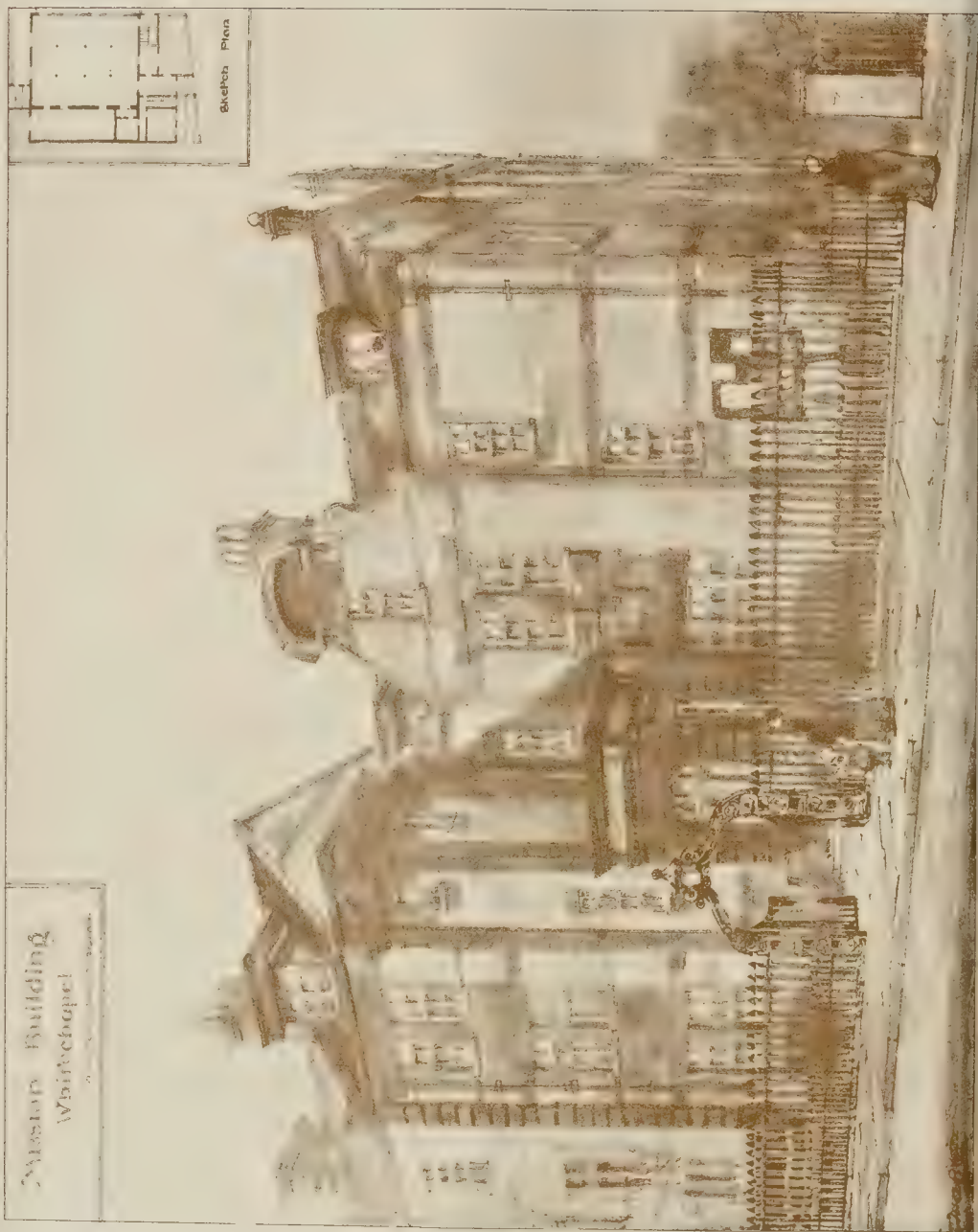


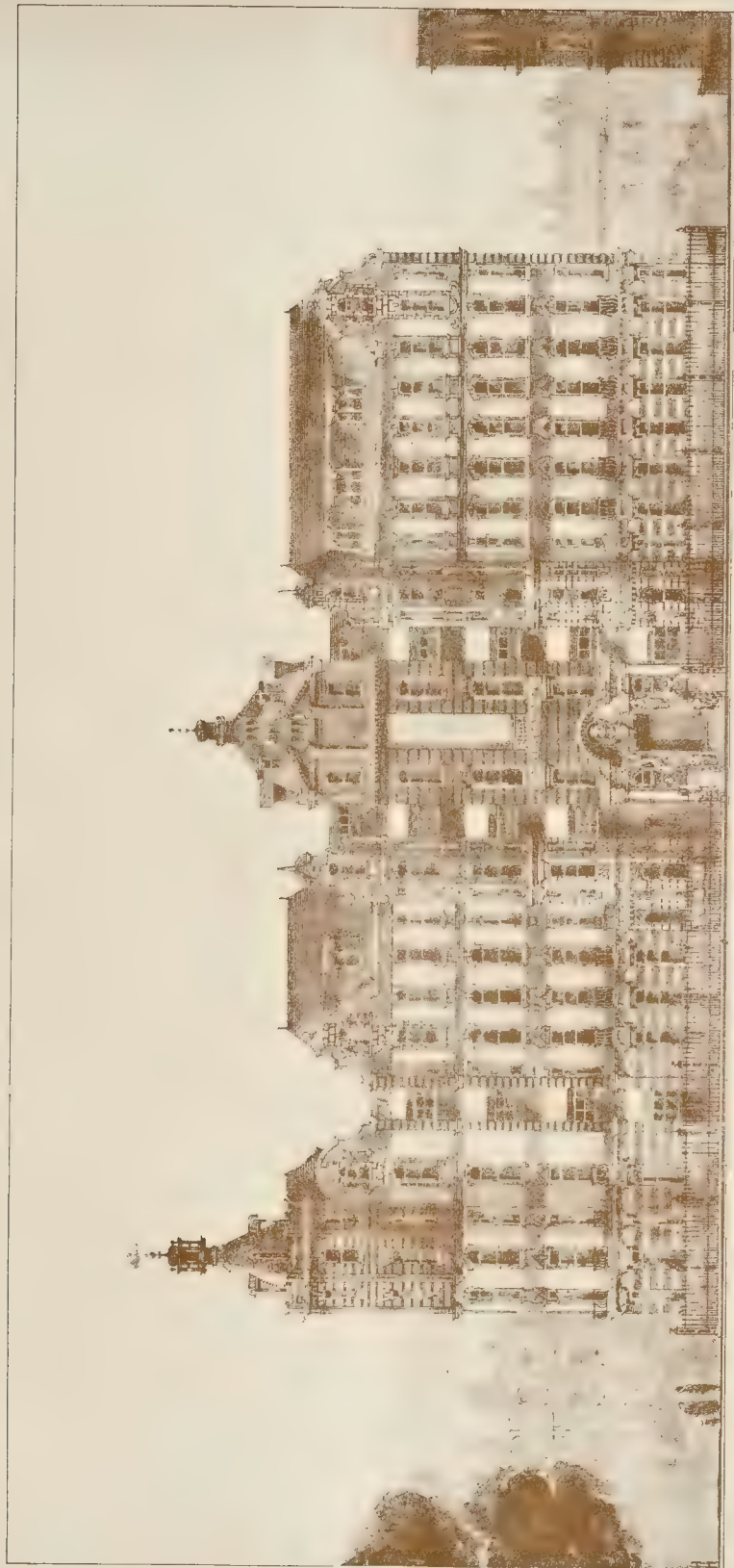


PULPIT, ALL SAINTS CHURCH, ENFORD. MR. C. E. PONTING, F.S.A., ARCHITECT.



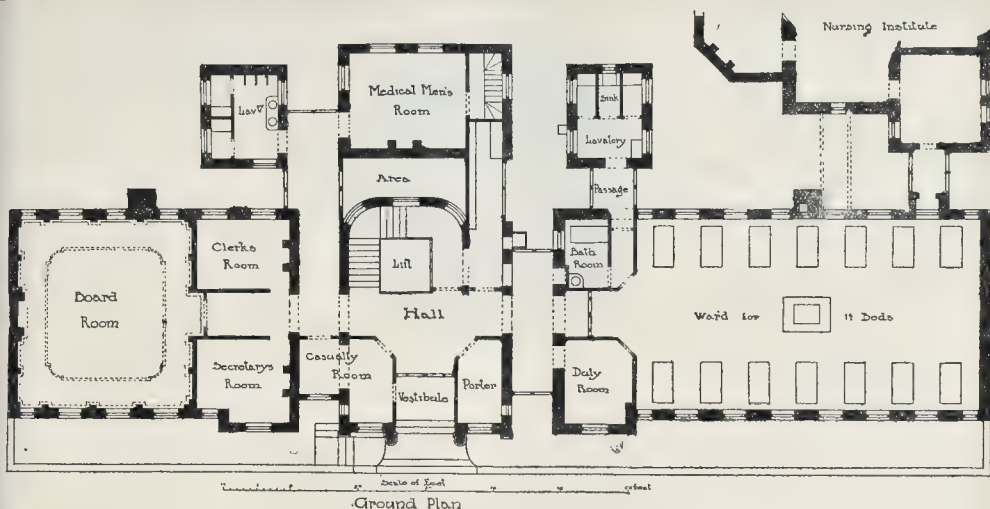
THE BUILDER, SEPTEMBER 9, 1893





NEW HOMEOPATHIC HOSPITAL, GREAT ORMOND STREET, M. W. A. 1891. E. K. I. B. A. A. C. H. 1891.





Plan, Homoeopathic Hospital, Great Ormond-street.

the hospital above. The Board-room and offices are on the ground floor, and the kitchens at the top, the central portion of the building being for administrative purposes. The architect is Mr. William A. Pite, F.R.I.B.A., of Bloomsbury.

The drawing from which the illustration was taken was exhibited in this year's Royal Academy exhibition.

PULPIT, ALL SAINTS' CHURCH, ENFORD.

THE Church of all Saints, Enford, is one of the most interesting in the valley of the Salisbury Avon. It has recently been restored, after a long period of neglect, and much injury from the fall of the spire early in this century, and subsequently injudicious reparation. The former box pews, gallery, and the two three-decker pulpits, all of that period, have been replaced by more suitable fittings.

The pulpit illustrated is one of these, and, as the inscription shows, was a gift:—

"To the Glory of God and in Memory of Christopher Flood Cooke, R.D., Vicar of this Parish 1875—1891, this pulpit is erected by his five children."

Among the objects of interest in the church are the ancient inkstand, with a receptacle for sand (the precursor of blotting-paper); and the hour-glass stand. The latter has been replaced in its old position.

The pulpit has been executed by Mr. Harry Hems from full-size drawings prepared by the architect, Mr. C. E. Ponting, F.S.A., Diocesan Surveyor.

DESIGN FOR CHAPEL FOR GRAY'S INN.

THIS is a design which was submitted by its author, Mr. A. H. Skipworth, in a competition for a new chapel for Gray's Inn, which seems to have been rather a pretence; at all events we have heard of no definite result from it. The design is graceful and unpretentious, and in its union of Late Gothic with Renaissance features seems in keeping with its proposed site.

ARCHITECTURAL SOCIETIES.

BUCKS ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETY.—The annual excursion of this Society took place on the 23rd ult. to Windsor Castle. Under the guidance of Mr. W. H. St. John Hope, M.A., the various state rooms, library, and other parts of the interior were visited in the morning till luncheon time. After luncheon the annual business of the meeting was discussed, under the chairmanship of the Rev. R. Chilton, Vicar of High Wycombe. The minutes of the last annual meeting were read and confirmed. Mr. John

Williams, the treasurer, gave his annual report. The annual subscribers were 150, compounders 19, life members 14, honorary members 6. Two influential and active life members had recently died, Dean Bickersteth and Mr. Robert Gibbs. Mr. John Parker, F.S.A., proposed a vote of thanks to the Lord Chamberlain (Lord Carrington) for giving his permission to the members to visit the castle; also to Mr. W. H. St. John Hope for so kindly undertaking the duties of guide. This was seconded and unanimously carried. The members then reassembled at the castle, and examined the crypts and various points of the building outside, also St. George's Chapel and the Albert Chapel. A few members paid a visit to Eton College, where various points of interest were explained by Mr. A. H. Cocks.

ARCHÆOLOGICAL AND ARCHITECTURAL SOCIETY OF DURHAM AND NORTHUMBRIA.—The fourth meeting for the year of the members of the Archaeological and Architectural Society of Durham and Northumberland took place on the 25th ult. The members were driven in brakes first to Morpeth Parish Church (St. Mary's). There the President, Canon Greenwell, introduced Mr. C. C. Hodges, Hexham, who described the architectural features of the building. The communion plate and the registers of the church were exhibited by the rector, the Rev. H. J. Bulkely. Returning to the brakes the company were driven through Morpeth to the site of Newminster Abbey. Mr. Fowler here gave an address, referring to the foundation of the abbey by the Cistercians, and described the arrangement of the monastery buildings. A drive by the banks of the Wansbeck soon brought the party to Mitford, where the Church of St. Mary Magdalene was described by Mr. Hodges, the Manor House with its original dog-spit by the Rev. J. Walker, Whalton, and the castle by Canon Greenwell and Mr. Hodges. By way of Spital Hill and Penridge the party were driven to Cockle Park Tower, an ancient pile of the better type. The President and Mr. Green again told the members the historical and architectural story of the building. Returning to Morpeth the party dined together at the "Queen's Head," the President being in the chair.

COMPETITIONS.

ENLARGEMENT OF METHODIST COLLEGE, MANCHESTER.—The competition for the enlargement of the Manchester Primitive Methodist College has just been decided. The first position has been accorded to the plans of "Cantab," submitted by Mr. J. Gibbons Sankey, M.A., of Manchester, the second place being given to the plans sent in by Messrs. Davidson & Bendle, architects, of South Shields. Mr. Sankey has therefore been appointed to carry out the works at a cost of about 6,000*l*.

Correspondence.

To the Editor of THE BUILDER.

"HYDRAULIC FORMULÆ."

SIR,—In the very interesting "Notes on Hydraulic Formulæ" by Mr. W. S. Crimp, which you published in your number of the 19th of last month, mention is made of Kutter's Formula, and, as this formula is now gradually coming into general use in various countries, a few remarks concerning its origin might not be out of place.

This formula has the great advantage of not being derived from theoretical deductions, or from one set of observations only, but is called by its authors, Messrs. Ganguillet & Kutter, Swiss engineers, an empirical formula, as it is based upon over 900 experimental velocity observations in almost all parts of the globe. These actually observed velocities were carefully compared, so as to discover the laws which regulate them all, and the result of these careful researches was the well-known formula. Having been derived from so large a number of velocities measured under all sorts of conditions, it cannot be doubted that the formula admits of universal application, and is entitled to be considered with confidence.

With a view to throw some light upon the coefficient of roughness "N," which influences in its turn the co-efficient of mean velocity "C," I have collected the information available from all parts of the globe, and am still doing so, but have had to discard a great number of observations, owing to great differences in the results. Observations of velocities should be conducted with the greatest possible care and accuracy, and the conditions under which they are made should be such as to admit of general application, otherwise they will only be misleading, and not further the end in view. I know of a case where the velocity in a 7 ft. 6 in. barrel varied in every experiment, the lowest being 0.925 ft. per second, and the highest 4.062 ft. per second, with the corresponding values for "C" the co-efficient of mean velocity of 79.95 and 146.64, hence there was a difference in this case of 337 per cent. between the least and the greatest velocity. With a thick sewage, and before flushing, the velocity was low, but rose at once with a thin or diluted sewage, and after the culvert had been flushed, so that it was dependent on the condition of the sewer and the composition of the sewage.

Therefore, in order to be of any practical value, velocity observations must be conducted with the greatest care and skill, otherwise they will meet with the same fate as those made in connexion with the main drainage of London, upon which 7,189*l*. were spent, and which are said to be absolutely valueless.

H. ALFRED ROEHLING.

DEVONPORT PARK IMPROVEMENT SCHEME.—We are informed that at the last Council meeting of the County Borough of Devonport, the Parks and Pleasure Grounds Committee reported the acceptance of the design bearing the motto of "Pro Bono Publico," the author of which was found to be Mr. D. Priestley Shires, of Plymouth, and is for an ornamental building, to be used as a park-keeper's residence and shelter, to be erected on the west side of the park. The premium offered was 20*l*., and a large number of designs was received.

The Student's Column.

GEOLOGY XI.

THE STRUCTURE OF CALCAREOUS ROCKS.

CALCAREOUS rocks may be divided into two groups, according to their mode of origin:—

1. Organically formed: originating in the manner described and illustrated in Article IX., fig. 1, viz., the "shelly deposit."

2. Chemically formed; the carbonate of lime having been in solution in water, and deposited by reason of the water becoming supersaturated with it, or from analogous causes.

Certain rocks serve as links between extreme types of the organic and chemical deposits.

Commencing with the organically-formed group, we may say that for the most part the rocks included thereunder are made of the shells, or "tests" of various organisms, and which may have accumulated (a) in the sea (b), in rivers (c), or in lakes. The shelly formations laid down in b and c are nearly always mixed with a considerable proportion of foreign matter, and, with but few exceptions, are more or less incoherent in nature. Moreover, they are usually locally distributed and of little thickness. It is characteristic of fluviatile and lacustrine deposits that they are very variable in lithological composition (see article X., fig. 2), and the shell beds are not often of much commercial value. In rare instances, beds of whitish freshwater shelly limestone occur in the Oligocene formations of the Isle of Wight, which, at Binstead and other places near Ryde, were formerly worked as a building stone; such limestones are occasionally burnt for lime.

The calcareous deposits useful to the architect have nearly all been laid down in the sea; the shelly deposits have in many instances been transformed into compact rock by the agency of infiltrating mineral matter which has acted as a species of cement. The following photograph (fig. 1) of a microscopic section of Ham Hill stone, quarried near Yeovil in Somerset, and much used for building purposes, illustrates a

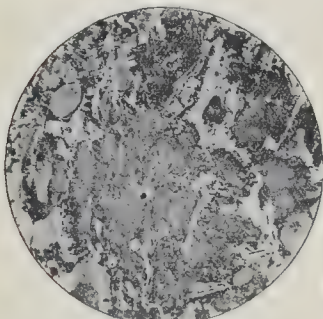


Fig. 1.—Micro-Structure of a Shelly Limestone.

typical shelly limestone. It will be observed that nearly the whole stone is made of fragments of shells and the hard parts of organisms of various kinds. The light-tinted long strips are longitudinal sections of marine fossil shells, two or three ovoid patches are sections across corals the septa of which are clearly distinguishable; a foraminifer, almost circular in shape, appears near the centre of the illustration; the ground mass between these various fragments is composed of minute pieces of broken shells and a small proportion of "shell-mud." White spots indicating minute quartz grains are here and there seen. The whole is more or less bound together by semi-crystalline calcite, which makes it into compact stone.

Another and very different kind of shelly limestone is exhibited in fig. 2, which represents a photograph of a micro-section of Hopton Wood stone, quarried at Middleton, near Wirksworth in Derbyshire, and sometimes used as a marble. A great portion of the stone was constructed of fragments of crinoids—a kind of sea-urchin, on a long stalk—but they are so obliterated by the alteration wrought in the stone by the action of carbonated water and the filling in of every space and crack by crystalline calcite, that their original character is almost lost sight of. Nevertheless, the circular or ovoid form of some

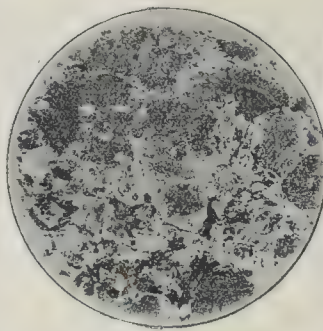


Fig. 2.—Micro-Structure of a very Crystalline Shelly Limestone.

crinoid stems are discernible. This stone, therefore, is almost entirely made of crystalline calcite; the lines of cleavage of the mineral are very clearly shown running parallel to each other, two sets running obliquely. The student will perceive the vast difference in structure between this and the Ham Hill stone, although both are classed as shelly limestones; he will also recognise the methods whereby loose shelly bodies can be transformed first to compact rock, then into a more crystalline limestone, and finally into shell marble.

We pass now to the consideration of the second division of the calcareous aqueous rocks—those formed under water by chemical agency. Certain of these are mere beds of calcareous mud and have been laid down in water supersaturated with carbonate of lime, by deposition of the superfluous mineral matter. These constitute a very inconspicuous class so far as we are concerned.

Another kind is known as oolite; its origin, however, is wrapped in much obscurity. The rock derives its name from the Greek *ὄον*, an egg, and *λίθος*, stone, in allusion to the fact that it is largely composed of minute egg-shaped bodies, bearing a fanciful resemblance to the roe of a fish. Fig. 3 is an example of a true oolite, and represents a photograph of the micro-structure of Ketton stone, quarried near Stamford, in

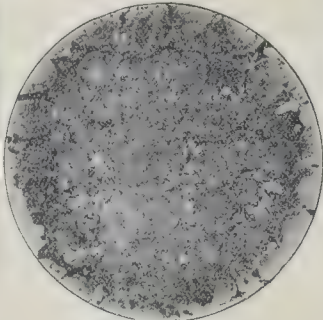


Fig. 3.—Micro-Structure of Oolite.

Lincolnshire. It will be perceived that nearly the whole of this rock is made up of ovoid bodies of peculiar structure. In section each spherule is seen to possess an outer crystalline calcite covering, inside which a number of concentric rings make their appearance until the centre is reached. The latter is occupied in most instances with a microscopic fragment of shell, or sand, which forms the nucleus of the spherule. Minute cracks, sometimes filled with calcite or other mineral, radiate from the centre to the circumference of each ovoid body, though that phenomenon is not so characteristic of the Ketton as of some other oolites. To account for the origin of the spherules some have assumed that the grain of matter forming the nucleus of each, rolled about on the sea-floor in water highly charged with carbonate of lime, and thus became covered by successive coatings of that material. The reason why the egg-shaped bodies are so uniform and did not attain a larger size was

because fragments to form nuclei were continuously introduced, which covered up the previously-formed spherules. Other observers have shown that in cases where a rock contains spherules of the size of peas—*pisolite*—minute tubes ramify those bodies. These tubules are believed by some to be of organic origin, and if this is so the spherules have been formed by organic and not by chemical agency. Quite recently, also, it has been shown that certain water-plants, *algæ*, secrete granules of carbonate of lime. We are willing to admit that certain pisolites contain tubules, and may be of organic origin; but we have never observed the tubular structure in oolites, though we have carefully examined a large number of micro-slides of the stone with the object of detecting them. Moreover, we believe that the phenomenon of interpenetration, immediately to be described, militates seriously against the supposition that oolitic granules are of organic origin. Our own observations, extending over a long period, have led us to the conclusion that whatever may have been the initial causes of the formation of the granules, a considerable proportion of each (the outer layers concerned in the interpenetration) is in the majority of instances of secondary origin—i.e., the outer coats were not formed until after the original granules were laid down.

Reverting to the section of Ketton stone (fig. 3) we see that several of the egg-shaped bodies are joined together, some even interpenetrate, their outer coatings being merged together. This union of the spherules assists in making the whole into a compact mass, for there is very little cementing matter.

We have remarked that certain calcareous stones occupy a median position between the organic and chemical groups. One such rock is exemplified by the photograph (fig. 4) of a micro-section of Weldon stone, quarried near Kettering in Northamptonshire. Comparing this with the Ketton stone (fig. 3) we find that a large number of oolite spherules are present, though they have a slightly different structure. The most striking difference is the intercalation in

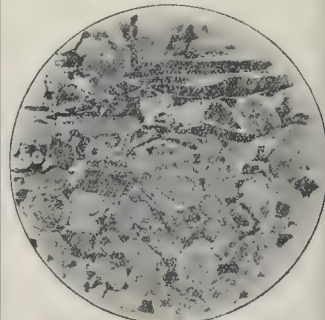


Fig. 4.—Micro-Structure of Shelly Oolite.

the Weldon stone of several longitudinal strips of crystalline calcite which are sections of the shells of fossil mollusca. Not only do the egg-shaped bodies touch and occasionally interpenetrate, as in the Ketton, but there is more cementing material (calcite) binding the whole very firmly together.

In some countries immense tracts of rock have been formed of fragments of coral and coral sand, bound together chemically by carbonate of lime. In Devonshire and elsewhere we also have marbles made of corals, bound together by crystalline calcite so compactly as that the stones take a splendid polish.

The hydrous sulphate of lime, gypsum, from which plaster of Paris is made, is a chemically-formed calcareous rock; so is its ally, alabaster.

Marl is the name given to a deposit composed of clay and lime, often used in the manufacture of hydraulic cement.

SURVEYORSHIPS.

WAVERTREE, LIVERPOOL.—At a special meeting of the Wavertree Local Board, held on Monday, Mr. W. H. Travers, of Wallasey, was appointed Surveyor and Inspector of Nuisances to the board, at a salary of £200 per annum. Mr. Travers, who is Assistant Surveyor to the Wallasey Local Board, was selected out of 106 applicants.

GENERAL BUILDING NEWS.

PROPOSED SCHOOL, WOLVERHAMPTON.—At a meeting of the Wolverhampton School Board, held on the 1st inst., it was resolved that the plans prepared by Mr. Fleeming, Architect to the Board, for a new school to be erected on the Walsall-street site, be accepted.

CONGREGATIONAL CHURCH, AMBLE, NORTHUMBERLAND.—The foundation-stone has just been laid at Amble of the new Congregational Church. The building will be carried out in freestone from the Birling Quarries, near Warkworth. A single spanned roof covers the building, the severity of the outline being broken by the transept gable and the gables at the end next Church-street. The church will be entered by a porch from which two lobbies conduct to the aisles, the latter, like the rest of the floor, having a slight fall towards the rostrum. Internally the chief effect is centred at the rostrum end, the transept having an arched opening to the main building, and the rostrum itself being carried out in pitch-pine. The whole of the seating is in pitch-pine. The roof internally will show moulded and curved roof principals, with plaster panels. Behind the church is a wing containing ministers', deacons', and choir vestries, kitchen and heating chamber, with a large meeting-room. The church will accommodate 406. The architect is Mr. G. Revell, Jun., of Alnwick.

PROPOSED ALTERATIONS, &c., TO DUMB AND DUMB INSTITUTION, NEWCASTLE. Plans prepared by Mr. Wm. Lister Newcombe, architect, of Newcastle, for proposed alterations and additions to the Northern Counties Institution for the Deaf and Dumb, Newcastle, have been approved by the committee of the Institution. The plan of the contemplated extension embraces a central or administrative block facing the south, containing a large dining hall for the use of the pupils, with kitchen, sculleries, and stores adjoining, the school room and glass rooms being on the upper floor approached by separate staircases from the boys' and girls' pavilions. To the east of this new wing, to be occupied by the boys, numbering probably from 100 to 120; and to the west, the present building, which, with a few alterations, can be arranged to accommodate from 50 to 100 girls. The three separate buildings are to be connected by a covered corridor, and provision is made for the erection of a large swimming bath and a gymnasium. These latter, though not absolutely necessary, are considered highly desirable. To carry out this scheme it is estimated that the sum of 15,740*l.* will be required.

NEW CATHOLIC CHURCH, CARDIFF.—On the 28th ult., Cardinal Vaughan opened St. Paul's Church, Cardiff. The new church is in the Early French Gothic style. The exterior walls are built in blue Pennant stone, with Bath and Radyr stone dressings. The size of the church is about 80 ft. long by 31 ft. wide; sanctuary, 24 ft. by 20 ft., with priests' and boys' sacristies, confessionals, and baptistry. The mosaic tile work has been executed by Messrs. Patterson & Co., of Manchester, and the ornamental iron work and columns by Messrs. James Allan & Son, of Glasgow. The architect is Mr. Charles C. Jones, of Cardiff and Penarth, and the contractor Mr. J. Gibson, of Cardiff. The accommodation is for 600, with 200 additional in the gallery, and the cost will be about 2,000*l.*, exclusive of the proposed alterations to the schools. A central niche in the facade will be filled with a statue in Carrara marble of St. Paul. Caen stone has been used in the construction of the altar. On the right of the chancel is to be erected a marble altar. The baptistry is approached by a pair of wrought-iron gates, whilst inside is a symbolical rose window of stained-glass, by Hardman & Co., of Birmingham.

SCHOOLS, BELFAST.—New schools at the corner of Hurst-street and Kenmare-street, Sandy-row, Belfast, erected in connexion with the Sandy-row Methodist Church, were opened on the 2nd inst. The premises consist of a two-story building, 70 ft. long by 45 ft. high, containing an upper and a lower schoolroom, infants' galleries, and class-rooms. The building is of red brick, with red sandstone facings, and above the principal entrance is a sandstone pediment. Each of the chief rooms is 30 ft. by 20 ft., while the infants' galleries—one on each floor—are 18 ft. by 10 ft., and one of the class-rooms is 12 ft. by 8 ft., and the other 17 ft. by 8 ft. The building has been erected by Messrs. Hewitt from the plans of Mr. J. J. Phillips.

METHODIST SCHOOLS, SHEFFIELD.—Five memorial-stones were laid on the 28th ult. at the rear of Bethel Primitive Methodist Chapel, Cambridge-street, Sheffield, where new Sunday school premises are being erected. The schools will accommodate 200 children, and will be built on the modern plan of separate class-rooms. In addition, a new ministers' vestry is being made, while the choir are to be provided with a room at the rear of the orchestra. The chapel is also being renovated. The work, which is to cost nearly 3,000*l.*, is being done by Mr. Charles Farrow, the sub-contractors being Mr. Arthur Bradbury (masonry), Messrs. Holmes & Brown (carpentering), Messrs. J. Puttrell & Co. (painting), Mr. R. Wilson (plastering), and Mr. W. Proctor (slating). The architect is Mr. W. J. Taylor, Sheffield.

BOARD SCHOOLS, MANCHESTER.—On the 2nd inst. the memorial-stones of two new schools in connexion with the Manchester School Board were laid by members of the Board. The first was the Higher Grade Board School in Devonshire-street, Ardwick, and the second a school to take the place of the Pottery Lane School, situate in Ashton Old-road, Openshaw. The Ardwick school is intended to accommodate 500 boys. The building is three stories high, with semi-basement containing gymnasium or assembly hall 49 ft. by 32 ft.; chemical laboratory 60 ft. by 24 ft. 6 in., a lecture-hall 32 ft. by 25 ft. 6 in., and a manual instruction room 52 ft. by 23 ft. The ground floor consists of a central hall, 58 ft. by 34 ft., and six class-rooms, each to accommodate sixty to seventy scholars. The first floor contains three large rooms, each 78 ft. by 24 ft., and will be divided by movable glass partitions into eight separate class-rooms. There are three staircases, one in the rear, and two at each end of the front block. The staircases and corridors are lined with ivory glazed bricks, with enamelled coloured brick dados. All the class-rooms will have enamelled brick dados. The entire cost, including the site, is estimated at 20,000*l.* The schools are being built by Messrs. R. Neill & Sons, of Manchester, and the architects are Messrs. Maxwell & Tuke. The Ashton Old-road School is the first complete example, it is stated, in the Manchester district of the central hall system, which differs from that hitherto adopted by the Board in that the work of each class is carried on in separate rooms, and the hall is used only for the purpose of assembling several classes for lectures, &c. The main front of the building faces Ashton Old-road, and the girls' entrance is in Taylor-street. On the left of an entrance-hall is a door to the cookery class-room, 30 ft. by 30 ft., and on the right are two arches, beyond which are the cloak-room, lavatory, hoist, and the staircase to the first floor, and to a playground on the roof. Swing doors at the end of this outer hall give access to the central hall, which is 100 ft. long and nearly 30 ft. wide. On the left are a large room for young children, with separate entrance and cloak-room, and two class-rooms, each 25 ft. by 24 ft., while on the right are three similar class-rooms and two teachers' rooms. At the far end of the central hall is the boys' entrance hall, where these arrangements are repeated, a covered playground taking the place of the cookery-room. Ascending the girls' staircase, the first floor is reached, and here again are cloak-rooms, lavatories, hoist and teachers' rooms as below. On this floor are seven class-rooms, each 25 ft. by 24 ft., and two larger ones 30 ft. by 30 ft. All the class-rooms are entered direct from the central hall, and the light is admitted in every case from the left of the scholars. The girls' staircase is continued to the roof, the greater part of which will be utilised for a playground, with two large covered spaces. The floors throughout are to be constructed of cement concrete, strengthened by steel joists, the passages, cloak-rooms, &c., being finished with a granite surface and the rest with boards and planks. The staircase is also of concrete. The class-rooms will be separated from one another and from the central hall by glazed partitions. The heating throughout will be by means of open fireplaces. The work is from the designs of Mr. Henry E. Steelfox, A.R.I.B.A., and the contractor is Mr. G. Macfarlane, of Manchester.

PROPOSED NEW CHURCH, PENMAENMAWR. A new church for Welsh services is to be erected at Penmaenmawr, on a site on the Penmaen-road. The plans have been prepared by Sir A. Blotfield, and the building is estimated to cost about 1,700*l.*

FREE LIBRARY, AYR.—On the 2nd inst. the Ayr Free Library was opened by Provost Shankland. The architect of the building is Mr. Campbell Douglas, Glasgow. The building, situated in Main-street, consists of two wings and a central part. The library and reading-room are on the ground floor, both leading off the entrance-hall. The reading-room, 52 ft. by 30 ft., is seated for 130 readers. In the library, the space allotted to the public is 30 ft. by 14 ft. The floor here is mosaic. There is shelving for 25,000 vols. The upper flat is taken up with a reference library, picture gallery, and museum, a ladies' room, and lavatories. The staircase is ornamented with a stained-glass window, having in the centre the Ayr coat-of-arms, and in the upper panel a portrait of Mr. Carnegie, the donor of the library.

NEW WELSH CHURCH, PONTCYMMER, GARW VALLEY.—On Monday the Bishop of Llandaff opened the new Welsh Church of St. Theodore at Pontcymmer, Garw Valley, in the parish of Llangein. The edifice, when completed, is estimated to cost 3,250*l.*, and will accommodate over 400 adults. It is built from designs prepared by Messrs. Bruton & Williams, Cardiff, by Messrs. Hatherly & Carr, contractors, Bristol.

COTTAGE HOSPITAL, DARTMOUTH.—We learn that the designs for the Cottage Hospital at Dartmouth, submitted by Messrs. Tait & Harvey, architects, of Exeter, have been accepted. The main wards will be 30 ft. by 22 ft. and 11 ft. high, and will afford accommodation for six beds. The wards face south and east, and each is provided with a bath-room, scullery, and other accommodation. There is to be a side entrance in connexion with the kitchen and offices, which will comprise a kitchen,

larder, scullery, and the usual cellars. The operating room opening on to the main staircase will be lighted from the top, and immediately opposite, and close by, will be the separation ward. Three rooms are to be provided for the matron and servants. Wood block paving will be used on the ground floor, and the wards will be heated by means of open fireplaces, fitted with warm air ventilating grates.

NEW CHURCHES, RHONDDA VALLEY.—On Monday the memorial stones of two churches were laid in the Rhondda Valley, Glamorganshire. The first ceremony took place at Ynysfio, near Treorik, where an edifice is to be erected, to seat 450, at a cost of 2,300*l.* The new church will consist of a nave, north and south aisle, and a chancel, and the contract has been let to Mr. John Edwards. At Ton a similar ceremony was gone through. In this instance it is the old Parish Church, which has been twice restored, that has been taken down and re-built, with a new nave and chapel, at a cost exceeding 2,600*l.* Mr. Alban Richards, Pentre, is the contractor, the architect in each case being Mr. E. M. Bruce Vaughan, of Cardiff.

SANITARY AND ENGINEERING NEWS.

THE WIRRAL RAILWAY EXTENSION TO SEACOMBE.—The contract for the construction of the short line of railway, about two-and-a-half miles in length, which is to connect the Seacombe and Liscard district with the Wirral Railway system, has been let to Mr. T. W. Davies, of Cardiff, and the undertaking has been already commenced. The new line, which, according to the terms of the contract is to be completed in eighteen months, is to cost 50,000*l.*, and fourteen bridges will have to be built.

SEWAGE SCHEME, GRETTING AND YORKSHIRE.—A Local Government inquiry has just been held at Mechanics' Hall, West Vale, Halifax, by Mr. Tulloch, one of the Local Government Board Inspectors, relative to an application by the Greeting Local Board to borrow 2,000*l.* for the purpose of sewage and sewage disposal works. Mr. Longbottom, who represented the Local Board, stated that the Board, under pressure from the County Council and the Local Government Board, in February, purchased a plot of land adjacent to the Calder, containing 10,850 yards, and the idea was to construct the works now proposed. The land was at the lowest point, and the sewage consisted entirely of top water and solids from the houses. Afterwards the Inspector went to view the site.

SEWERAGE WORKS, &c., BOLTON.—Major-General Crozier, one of the inspectors of the Local Government Board, conducted an inquiry at Bolton on the 2nd ult. into the application of the Corporation to secure power to borrow 40,000*l.* for electric lighting works, and 5,000*l.* for works of sewage. There was no opposition. The Town Clerk explained in regard to the sewage question that the application had arisen through the action of the Corporation in deciding to carry out certain alterations in the closet accommodation of the borough. There were a great many old sewers in the centre of the borough which were on what was known as the rubble drain principle. These were not watertight and were consequently unfit to receive or carry away water-closet matter, and it was proposed to replace them with sewers of brick and pipe construction. The streets affected by these alterations numbered about seventy.

DRAINAGE SCHEME, NANTLLE VALE, CARNARVON.—On the 2nd inst. the first sod was cut in connexion with an undertaking for draining the Nantlle Valley, so as to prevent the inundation of several of the principal slate quarries in that centre. The scheme for draining the whole valley, by deepening and diverting the course of the river Llynfynydd, was propounded some two years ago. The river Llynfynydd will be widened for a distance of nearly two miles, and its depth will be 8 ft. below the level of the lower Nantlle lake. Mr. Moorsom, C.E., Manchester, is the author of the scheme, and the contractors are Messrs. Wynnard & Braddock, Wigan, the estimated cost of the undertaking being 10,000*l.*

WATER SUPPLY, &c., BALDOLN, YORKSHIRE. At the Baldoln Local Board Offices on the 2nd inst. Mr. F. H. Tulloch, A.M. Inst. C.E., held an inquiry into an application by the Local Board to the Local Government Board for sanction to borrow 6,750*l.*, 5,500*l.* for water supply, 600*l.* for street improvements, and 75*l.* for fire appliances. After the close of the inquiry the Inspector visited the reservoir and other works.

THE DRAINAGE, MONMOUTH.—At the monthly meeting of the Monmouth Corporation, held on Monday, the mayor alluded to the drainage question, and said that as certain points were not mentioned in the schemes sent in for competition, he had an interview with Mr. Lailey, civil engineer, of Westminster, and after laying his ideas before him, he undertook to see if they were practicable, and to provide a scheme. Mr. Lailey visited Monmouth, and afterwards sent a scheme, and he was glad to see that in the plans submitted it was proposed to collect all sewage by gravitation. One point he, the mayor, had in view was the avoidance of syphons under the river. Another point was to utilise water as

the surveying expeditions and triangulation in the chronological order they have been undertaken. Not till after Newton (1642-1727) had developed the theory of mathematics, and Ramsden had invented his dividing engine (1750), did surveying reach what may be called an exact science; but between that date and 1800 surveying may be said to have been strongly in the ascendant. The present system was developed during that period. Mr. Haskold's paper is valuable for historical reference.

THE ANTWERP INTERNATIONAL EXHIBITION, 1904.—The promoters of the great international exhibition to be held in Antwerp next year are making the greatest efforts to ensure complete success. A limited company, *société anonyme*, has been formed for working the undertaking, of which King Leopold and his brother, the Comte de Flandre, are patrons and presidents. The executive committee is under the presidency of Baron Oley de Gevaert, governor of the province of Antwerp, and M. Van Ryswyck, burgomaster of the Belgian Liverpool. Naturally, with the enormous mineral resources of Belgium, mining and metallurgy take the foremost rank. Thus "Group I." embraces mineral and metallurgical industry, whilst "Class 15" includes specimens of rocks, minerals, ores, mineral fuel, coal produce and substitutes for such, and plans of working with plants. "Class 19" embraces the metallurgy of iron and steel, pig-iron, bars, finished iron, steel, metallic alloys, and all kinds of manufactured iron and steel goods. "Group IV." embraces mechanical construction, including boilers, winding and pumping apparatus, safety appliances, heating, ventilation, &c. "Group VIII." embraces architecture, building, and kindred subjects, with sculpture and art. No doubt the second exhibition in the Scheldt will prove as successful as its predecessor of 1885.

ALTAR, ST. PETER'S CHURCH, BUDLEIGH SALTERN.—A side altar has just been placed in the morning chapel of the new Church of St. Peter at Budleigh Salterton. It has been designed by Mr. George H. Fellowes-Prynn, F.R.I.B.A., of 6, Queen Anne's-gate, Westminster, the architect of the new edifice, and made by Messrs. Harry Hems & Sons, of Exeter. The altar is of solid English oak, panelled in front and at its north and south ends. On its slab are the five consecration crosses, and there is also a super-altar and a tabernacle.

TURRET CLOCK, DONCASTER.—A new illuminated turret clock has been fixed and set going at the New Co-operative Society's premises, Doncaster. The work has been carried out by Messrs. Wm. Potts & Sons, clock manufacturers, Leeds, from instructions received by them from Mr. Herbert Athron, architect, Doncaster.

PROPOSED ELECTRIC LIGHTING OF DEWSBURY.—On the 29th ult., Mr. F. H. Tulloch conducted a Local Government inquiry at the Town Hall, Dewsbury, on the application of the Corporation of that borough to expend 25,000l. on a scheme of electric lighting. Mr. E. Mawdesley (Town Clerk) stated that Mr. W. H. Preese had been engaged to prepare specifications, and tenders for the works were invited, and had been let, subject to the sanction of the Local Government Board to borrow the money. The Corporation did not propose to expend the whole of the money immediately. Some of it was for extensions, supplying lamps, &c., which they did not expect to have carried out at present. The street at present were well lighted with gas.—Mr. A. H. Preese explained the works to the Inspector by means of a plan.—There was no opposition to the scheme.

PROPOSED TOWN IMPROVEMENTS, DOUGLAS, ISLE OF MAN.—On the 29th ult. arbitration proceedings commenced at Douglas in connexion with a scheme of town improvement by the Town Commissioners, which will result in the pulling down of the old part of the town and remodelling it on modern sanitary lines, the making of new streets, and the erection of blocks of artisans' dwellings. The net cost of the scheme, as sanctioned by the Tynwald Court, is about 40,000l., and the gross cost 80,000l.

RICHMOND HILL.—Full details of the new and important proposal for the future preservation of the view from Richmond Hill, which it is understood will come before the Town Council for consideration at their next meeting, were made public on the 2nd inst. It is now sought to preserve the view from the Hill for all time by reserving land on both sides of the river, and the same estate to afford an outlet for the growth of Richmond. The proposal suggests that a portion of the Old Deer Park—say 35 or 40 acres out of the total of 353—should be laid out for building purposes in order to provide the Crown with funds for the purchase of the land necessary to preserve the famous View. It is urged that Petersham meadows would thus be wrested from the grasp of the builder, as now threatened by the Marble Hill Estate, on the Twickenham side of the river, which has been in the market for a considerable time, would also be saved from the speculative builder by purchase, together with the meadows, for the preservation of the View. The suggestion is that the Corporation of Richmond should promote a Bill in Parliament authorising the purchase of these properties with any other land that may be necessary for the required purpose. It is argued that the proposed building

upon a portion of the Old Deer Park would be sufficient to pay for all the land required below Richmond Hill. The Bill will probably contain a clause authorising the amount of the purchase money to be fixed by arbitration. Against the cost there could be set the income which might still be derived from the land for agricultural or other purposes, which would not interfere with the View. No interference with the Richmond Athletic Ground or the cricket ground adjoining is contemplated. The proposed building operations would, it is believed, add very largely to the ratable value of the borough, and it is contended that as the Park is not open to the public, and is for the most part hidden behind houses and invisible from the public road, no injury would be done to public interests. It is further suggested that advantage might be taken of the opportunity to widen the roads in the immediate neighbourhood of the Park, thus effecting a much-needed improvement, and also to run a footpath across the Park to the new foot-bridge and lock, giving access to the river and to St. Margaret's and Isleworth.—*Morning Post*.

LYCH GATE, BERINGTON CHURCH, CHESHIRE.—At the Bebington Parish Church, on the 2nd inst., a lych gate was dedicated to the memory of the late Clarke Aspinall. The work of erecting the gate has been carried out by Messrs. Brown & Backhouse, Liverpool.

NATIONAL REGISTRATION OF PLUMBERS.—ANNUAL SCOTCH CONGRESS.—The fourth Annual Congress of the district councils of Scotland for the national registration of plumbers was held in Aberdeen on 31st ult., and 1st and 2nd inst. At the opening meeting in the Upper Hall, Marischal College (University Buildings), there was a large attendance of delegates (both master and operative plumbers) as well as of public representatives from the various districts in Scotland, and these were welcomed by Lord Provost Stewart in the name of the inhabitants, the magistrates, and the Town Council of Aberdeen. There were also present a goodly number of local Town Councillors, municipal officials, and leading citizens, including architects and medical men. Sir Stuart Knill, Bart., Lord Mayor of London, and Master of the Worshipful Company of Plumbers, having thanked the Lord Provost for the welcome extended to the Congress, the President—Dr. Matthew Hay, Medical Officer of Health of the City of Aberdeen, and Professor of Medical Logic in the University of Aberdeen—delivered an introductory address. In the course of his address, Dr. Hay traced the progress of the registration movement, and stated that a large majority of the master plumbers in the counties included in his district were now on the registration roll, and that the proportion of journeymen on the roll embraced the bulk of the best workmen. He advocated the claims for public support of the proper training of plumbers, chiefly on the ground that there were few, if any kinds of tradesmen, whose handiwork by its good or ill performance more directly affected human health. He emphasised the importance of plumbers receiving a thorough technical training, the hall-mark of which was to be registration, and discussed in detail the question as to how such training was to be had, expressing extreme regret and disappointment at the failure a few weeks ago of their more recent effort to obtain Parliamentary recognition of their registration system. He also said there ought to be in the larger towns systematic courses of lectures to plumbers in the different departments of their work; and, on the ground that the efficient training of plumbers was for the public good and the public safety, he appealed to the municipal and county authorities throughout Scotland to grant adequate assistance to the registration cause from the funds now at their disposal. Reports of the progress of the registration movement since the last annual Congress were then given in, such progress being on the whole steady and satisfactory though somewhat slow in two of the districts. Mr. Coles, Clerk to the Plumbers' Company, having explained the objects of the Plumbers' Registration Bill and the causes of its defeat, Sir John Leng, M.P. for Dundee, made an appreciative speech indicating that he would be in favour of such legislation on the reintroduction of the Bill. At the Congress dinner the Lord Mayor spoke on the action of the Plumbers' Company in connexion with the national registration movement, and encouraged those within the district to persevere and carry out the system which had been organised so well. At the second day's meeting it was unanimously agreed, after full discussion on reports submitted, to appoint a committee to frame model regulations and by-laws with reference to the plumbing and drainage works of buildings, and to submit these to the various district councils for consideration and approval, with instructions on receiving such approval to transmit the same to the various municipal and county authorities for sanction. It was also resolved to ask municipalities to employ registered plumbers only, and that masters employ only registered operatives. The reports made as to the progress of technical classes and examinations, and the assistance received on their behalf, were considered satisfactory. The Congress decided that masters should have the option of indenturing apprentices, and that the term of apprenticeship should be six years. Sir D. MacLagan, Professor of Medical Jurisprudence, University of Edinburgh,

acted as chairman during part of the second day's proceedings, in the course of which short speeches favourable to the registration scheme were made by Sir William Henderson, ex-Lord Provost of Aberdeen; Mr. P. Esslemont, ex-M.P. for East Aberdeenshire, now Chairman of the Scotch Fishery Board, and Sir William D. Geddes, Principal of the University of Aberdeen. The members proceeded on the afternoon, on the invitation of Sir William C. Brooks, Bart., to the forest of Glen Tana, and were shown over the irrigation and other works on the estate. At the third day's meeting it was resolved to recommend to the district councils to consider as to the advisability of their purchasing from publishers, for cash, new books on the subject of sanitation and plumbing, and disposing of them to operatives at cash prices, to be paid on the instalment system. It was also resolved that the letters "R.P." should be universally used to designate a plumber registered under the national system. The next Annual Congress was appointed to take place at Inverness, and the usual votes of thanks concluded the business proceedings. It may be mentioned that during the Congress there was an exhibition of plumbing apparatus in the Lower Hall of Marischal College, and that a demonstration was given by Professor Hay on the more recent and notable of sanitary and lighting appliances, the methods of dealing with sewer gas, and the proper ventilation of rooms, &c. A drive to some of the places of interest in the city brought the Congress to a close.

LIVERPOOL ENGINEERING SOCIETY.—The annual excursion of the members of this society took place on the 25th ult. The party, numbering about forty, arrived at Runcorn about three o'clock. They then journeyed by means of waggons to the Cheshire works of the Vyrnwy scheme of the Liverpool Corporation Waterworks. They inspected the Mersey aqueduct, and subsequently proceeded to the water tower, at Norton, afterwards going to Frodsham. The company returned home shortly after nine o'clock.

DISCOVERY OF AN ANCIENT ROAD AT ST. ANNES-ON-THE-SEA.—Whilst the workmen have been making the excavations for the new main drainage works at St. Annes, they have come across what some suppose to be the remains of an old Roman road. Close by the north end of Park-road, abutting on St. Annes-road, West, where they were about to lay the new drains, they discovered at a depth of quite 12 ft. 6 in. from the surface of the present street (which was only laid out when St. Annes was founded) the materials of a buried roadway of broken stone and cement, some 18 in. in thickness. This road had been 13 ft. wide, and seemed to run in a direct line from the short eastward, almost parallel with the present St. Annes-road.

SCIENCE AND ART SCHOOLS, VENTNOR.—On Tuesday evening the annual meeting of the inhabitants of Ventnor was held in the large room of the Public Free Library, and Literary and Scientific Institution, by the local Technical Education Committee for the district, when the prizes and certificates were distributed to the successful students in the Art and Science Classes, by Mr. J. C. Buckmaster, who also took advantage of that opportunity of delivering an address on "Art and its Uses." The chair was taken by Mr. J. W. Littlefield, J.P., F.R.S.A., and F.R.G.S., who, introducing the lecturer, paid a well-deserved tribute to the memory of the late Mr. Charles Ryan, who had presided over the School of Art for many years previous to his lamented death in Italy last spring. He explained that the chief object of the school-training was not so much to form sculptors and painters, as to encourage among the public a love and taste for art, and with that view he hoped that the day was not far distant when men and women would make their homes truly artistic, and put aside the vulgar taste which those homes often show in furniture and decoration. The Medieval architects succeeded in their buildings, where moderns too often failed, because their heart was in their work. The report of the Committee was then read by the Honorary Secretary, Mr. J. F. Livesey. The local prize-winners were Messrs. George Martin, A. J. Russell, H. Townner, and A. Armstrong, the last a boy of only twelve years old, whose freehand drawing was highly commended.

GLASGOW AND WEST OF SCOTLAND TECHNICAL COLLEGE.—To meet the growth of the architectural classes at this college, we hear that a studio will be opened this session. Mr. James Lochhead having been appointed instructor. He will be introduced to the students on the 4th October, at the opening lecture, which Mr. Charles Gourlay, A.R.I.B.A., will deliver, on "An Introduction to the Study of Architecture," which will be illustrated by lantern-slides, and by a number of photos collected by the lecturer during his recent travels. Mr. Allan Graham, Prob.R.I.B.A., has been re-appointed assistant to the building construction classes.

CONSISTORY COURT OF LONDON.—Dr. Tristram, Q.C., Chancellor of the Diocese has granted a faculty for re-seating St. Stephen's, Coleman-street, and removing the north and south galleries, erected fifty years ago to accommodate 100 persons. The entire alterations will extend to re-fronting the west gallery, set up in 1697, and laying down a new block floor, and are estimated to cost 2,500l.

therefrom and brought into the room for cleaning and similar purposes, and readjusted without the aid of special tools, or the removal of the beads or fastenings. Elaborate arrangements to this end are described in the specifications.

8,142.—Moulds: *E. A. R. Avenarius*.—Boxes and moulds used for artificial stone, which may be fixed and taken apart in the most convenient manner, are made

forming the four sides separate from each other and securing them by corresponding projections as well as by rails.

NEW APPLICATIONS FOR LETTERS PATENT.

AUGUST 21.—15,785, C. Mace, Glaze for Floor Surfaces.
15,792, J. Mortimer, Socketed and Lined Access Drain and Water Pipes.—15,822, C. Wilde, Plastic Decoration of Surfaces.—15,871, A. Bell, Doors.
AUGUST 22.—15,869, C. Manchip, Marking and Punching Roofing Tiles. 15,881, Z. De La Roziere, Varnish for Woodwork.
AUGUST 23.—15,912, J. Sellers, Applying Cement or other Materials to Surfaces.—15,919, W. Hooker and C. Fitch, Hanging Sliding Windows, to be opened from the inside.
AUGUST 24.—15,970, J. Sim, Fittings relating to Case-ment Windows or Doors, and to other Doors.—15,993, W. Johnson, Machines for Pressing Bricks, &c. 16,020, A. Burton, Window Fastenings.
AUGUST 26.—16,030, H. Olney, Raising, Lowering, and Securing Sash Windows in Position.—16,086, T. Owen, Cutting Tenons in Woodwork, and for Shaping Timber, or imparting to it a given curvature.
AUGUST 27.—16,099, J. Whiteley, Raising, Lowering, and Securing Sash Windows in Position.—16,086, T. Owen, Cutting Tenons in Woodwork, and for Shaping Timber, or imparting to it a given curvature.
AUGUST 28.—16,122, A. Martin, Stoves.—16,128, E. Hughes, Stone-sawing Machines.—16,133, W. Thompson, Electrical Device for Opening Doors. 16,150, J. Gratton, Potter's Oven Bottom.

PROVISIONAL SPECIFICATIONS ACCEPTED.

15,981, E. Barnsley, Interchangeable Varnish Bottle, Paint Kettle, Funnel, and Strainer.—15,995, F. Lynde, Siphon and Tap. 16,174, R. Barker, Window Fastenings.—16,296, R. Doidson, Flushing Apparatus for Water-closets, &c. 14,484, J. Dungey, Flushing Apparatus for Closets, Latrines, &c. 15,221, C. Rowland, Drain-pipes.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

16,438, E. Smith, Certain Improvements in Spring Latches for Doors.—16,089, D. Baron, Ventilating Rooms and Buildings.—2,850, C. Perry and J. Thackeray, Construction and Arrangement of Water-closets.—13,947, M. Syer, Disinfecting Apparatus for Attaching to the Flushing Pipes of Water-closets and Urinals.—13,930, J. Shannon, Wood Graining Machines.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

AUGUST 28.—By Phillips & Co.: F. House, shop, and extensive stabling, George-yard, Whitechapel, r. 901, 2,250.
AUGUST 29.—By J. H. Hunter: 23, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 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3855, 3857, 3859, 3861, 3863, 3865, 3867, 3869, 3871, 387

ILLUSTRATIONS.

New Building for the Royal United Service Institution, Whitehall.—Messrs. Aston Webb & E. Ingress Bell, Architects	Double-Page Photo-Litho.
Courtyard of New House and Studio.—Mr. Howard Ince, Architect	Double-Page Ink-Photo.
Design for a House at Llandaff.—Mr. R. A. Briggs, F.R.I.B.A., Architect	Two Single-Page Ink-Photo's.
Design for a Book Cover.—By Mr. Rowland G. Jones	Single-Page Ink-Photo.
An "Albert Dürer" Window, Fairford Church, Gloucestershire.—From a Drawing by Miss Emma Knight	Single-Page Ink-Photo.

Diagrams Illustrating Article on Geology (Student's Column) ..

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American Methods of Forming Foundations.



THE rapid development of the resources and the opening-out of immense tracts of territory in a new country may be expected to evolve new methods of solving old problems to an extent which, in the older and more settled countries of Europe, is scarcely probable, and considerable interest must, therefore, attach to a review* of what has been, and is being, done in America in any such subject as that of foundations—as, indeed, in any problem of construction or practical arrangement where new conditions may be expected to give rise to, and occasion for, new ideas.

The conditions which make for the safety of foundation-beds, understanding by the term "foundation-beds" the strata of the natural earth on which the artificial construction rests, necessarily are the same in America as in Europe. The rocks of America are, considered as "foundation-beds," practically the same as here; the importance of level—or, at least, non-slipping—beds equal, as is also that of uniformity of material, and consequently, of settlement. We can understand the preference given to clay over sand or sand and gravel, rather than the opinion of some authorities who would class the three kinds of soil as equal in bearing-power and desirability. Clay is apt, as a general rule, to be superior for the reasons stated by our author, as well as on account of another cause that he omits, the general prevalence of thickness of stratum as a characteristic of clay beds, which tends to produce the uniformity of settlement that is so desirable in any foundation-bed not absolutely incompressible. American experience shows, in relation to clay, that with a good indurated bed 5,000 lbs. per square foot has been safely placed upon it. The same figure may be taken for sand, if properly secured from lateral shifting, and, *à fortiori*, for gravel. These figures are considerably in excess of the figures given by Rankine. Here, then,

we have one instance where the endeavour, which so usually accompanies constructional work in America, to cut things fine has been successful, and affords a fresh starting-point for European practice. Even in England there are instances where such loads have safely been put upon soils which caution might have considered dangerous. For bridge building, with which the work we have before us is largely concerned, the important element of scour, or water action, has to be constantly remembered.

The preparation of concrete in America is similar in methods to those adopted here, save that in the examples quoted cement is more generally used as the matrix than lime, and the proportion of cement is slightly higher than is used by architects. Both of these differences result from the fact that in the examples before us the work is of an engineering character, and hence more subject to the stress of water action. The cement used is apparently always of German or native production, and is inferior in grade to most English Portland cement. In passing we may note that one reason, and the chief one, why English cement is not more used in the States, is that it is of too high a quality to compete in price. If our manufacturers wish to supply the American market they must fit their goods to the quality that satisfies that market, and they will then be able to make their price both lower and more profitable.

With one statement in reference to the use of concrete we are rather at issue. The American view seems to be that spreading footings under a wall resting on concrete is needless, but except when the concrete is exceptionally well bonded and cemented such a course practically amounts to the waste of a considerable section of the concrete foundation.

The generalities in which our author deals in speaking of stone and quarrying do not specialise America from Europe, and, indeed, it is hardly possible to do so when considering only broad principles. To a great extent the same applies to masonry. The methods of stone working usually do not differ from our own. Difference of opinion prevails on the other side, as here, in relation to some points. Grouting, for example, has its advocates and its opponents. The backing of ashlar masonry, too, finds various theories or ideas to regulate it. Some think that

backing should be of large stones of the same height in course as face stones; others are satisfied that concrete, or even rubble, walling is good enough. It is interesting to note that the avoidance of too rigid conditions in the specification of masonry work is advocated as tending to increase the quality of the workmanship. The stoneworker or quarry foreman if left to himself to a certain degree can, and will, select stones of sizes to give good work better than if the precise size were specified.

The effect of ice pressure is a matter which in America has more interest in the design and construction of foundations of bridges and other structures in waterways than here. The immense amount of ice which accumulates in some American rivers, such as the Susquehanna and Schuylkill, causes enormous and unknown pressure upon the piers of bridges, and instances are given of bridge piers having been lifted bodily from their beds by the force of the ice expansion. It is, however, not only the question of the expansion of the ice, but the still more momentous effect of moving ice, especially prevalent in the early part of the year, when an "ice-gorge," as it is called, forms, and is urged forward by the early freshets. The best means of resisting the dangerous impact of moving ice appears to be the provision of substantial cut-waters or starlings of masonry, such as we universally find in Mediæval bridges. Cut-waters, too, are invaluable as a safeguard against the drift which rapidly flooding rivers often collect in large quantities, and which in America is only less formidable than ice.

The question of retaining walls is from the varying nature of the soil needing support so exceedingly inconstant that it is not surprising that the theoretical deductions of Rankine and Moseley, which are studied on this subject by Americans, receive but little respect, inasmuch as they give results which entail a larger expenditure of material and, therefore, of dollars, than is usually required for the sake of safety. The results of parsimony have, however, frequently been the cause of disaster in America, and, we need hardly remind our readers, occasionally in this country also. Many of us can remember to have seen retaining-walls showing signs of failure, either by sliding, by bulging, or by overturning.

The theories of arch construction meet

* "A Practical Treatise on Foundations." By W. M. Patton, C.E. New York: John Wiley & Sons, London: Kegan Paul, Trench, Trübner, & Co., Ltd.

with no more reverence than those relating to retaining-walls, although they are studied and known by the American engineer. Skew arches, on account of the extensive knowledge of stereotomy which they require from the workmen, are falling into disfavour in America as well as here, and devices are adopted there to get over the difficulty just as we notice in the widening of some of our own great trunk lines.

Bricks and brickwork are similar in their make and use to our own, save that considerable attention has of late been directed to what we may call bricks of fancy colours, which, though intended for facing, are nevertheless referred to by our author as foundations. The American architect has now at his command a large variety of tints and peculiar textures in his brickwall surface; indeed, the desire for novelty of effect in this matter has been rather overdone, and the result is often fussy and unpleasing. We are somewhat surprised to note that the superiority in strength of English over Flemish bond is ignored, and that it is considered "probably immaterial which is used." Perhaps, however, we are in England inclined to attach too much importance to the fancied superiority of English bond, as, although there can be no doubt of that superiority if the bricks were laid dry, yet in a wall the work of the mortar has even a more pregnant bearing upon the strength of the construction than the bond of the bricks.

America is rich in highly hydraulic limes or natural cements, particularly in the Middle States, and these are frequently used where we should use a less hydraulic lime, and obviate the necessity of using ordinary lime concrete or lime mortar underground. There can be no doubt that the objection to the use of lime for works under the ground line, where they may be exposed to the action of moisture, if not of water in visible quantities, is a valid one, and the recommendation that a natural cement should be used is good, and is indeed often adopted in good work over here. The influence of temperature, whether of the atmosphere or of the water used for mixing cement, is well known and acted upon in America, and is worth remembering when rapid setting is desired. The use of a mixture of lime and cement is a debatable question amongst our friends across the water as amongst ourselves, and the truth appears to us to be that some kinds of lime may be mixed with some kinds of cement without appreciable mischief, but that with other limes and other cements the case is reversed.

The cost of work in America seems, measured by merely cash value, to be higher by, say, about 20 per cent. in round figures, but it must be remembered that labour is dearer in the States than here.

Timber for foundations is used far more largely in America than by ourselves, not only for piling but as planking under walls and for cribs to contain concrete or stone foundations for piers of bridges and other water-side structures. It is to be noted that the use of timber for foundations is, however, never thought desirable unless the wood always remains wet. Timber appears to be usefully employed where the foundation bed is of very soft nature, such as silt or quicksand, inasmuch as considerable distribution of the load, and hence decrease of the unit pressure, can be economically effected.

The timbers used in America for the purposes of foundations are principally the white pine of the North and the yellow pine of the South, the latter being somewhat superior in hardness and strength. The spruce pine grown in the Middle States seems to be inferior to either of the above in strength and durability. An interesting point in connexion with these woods is the discussion as to the injury that is or is not caused to the quality of the timber by bleeding the trees of their resinous matter. The forest owner and the saw-mill owner maintain that the practice is not injurious, but their testimony is looked upon with some suspicion, as the one finds an extra profit in

the turpentine and resin and the other less labour in converting the trees. Experiments have been made which seem to show that the deprivation of their resinous matter does not decrease the strength, and this a brief consideration of the function performed by these juices in the growth of the tree would justify, but it is an open question whether the durability of the timber may be decreased, and time alone can solve the problem. Oak grows throughout the States, but differs very materially in quality, and this difference depends rather upon the nature of the soil than upon climate or latitude. Cypress timber is grown largely in the Southern States, and, though it has not the strength, exceeds the pines in durability, the blade cypress being especially good in this respect. Chestnut, poplar, elm, cedar, and other woods are too valuable for use in foundations, save in exceptional local circumstances. Thus, in Central America, *lignum vitæ* and mahogany have been used. The average life of timber, when exposed and not covered or preserved by some artificial means, is stated to be in America only some eight or ten years. This, therefore, leads to preservative processes being sometimes adopted, and we find that the American engineers recognise the value of creosoting as the best of all means of increasing the durability of timber; but the great expense, increasing the cost of timber from two to two-and-a-half times, tempts employers to follow the plan of letting the timber rot, and renewing it when necessary. For foundations, strictly speaking, such a course is suicidal, but for supporting structures above ground it is very generally followed. A rival to creosoting has been introduced in America, which, if the claims put forward in its favour can be justified, must prove a powerful competitor. This is called "vulcanising," and is defined as "heating wood and timber under great pressure." The wood is heated, in closed cylinders of steel 105 ft. long by 6½ ft. diameter, at a temperature ranging from 300 deg. to 500 deg. Fahr., under a pressure of 150 lb. to 200 lb. on the square inch. The rationale of the process is that in the destructive distillation of wood a powerful antiseptic is produced, and the method of vulcanising aims at the formation of this antiseptic and at the same time the retention of the valuable preservative in the pores of the wood by the great pressure applied. It is claimed that "the process of vulcanising seasons all timber, preventing any further warping, checking, or cracking. Such timber is not influenced by atmospheric agencies, bacteria or spores, and requires no paint for protection. The albuminous constituents of the natural wood have been coagulated by the high heating and rendered insoluble." This sounds rather like tall talk, but it has a considerable degree of plausibility and a logical scientific explanation. Experiments also appear to justify the claim made, as they show that "vulcanised" timber is increased in strength as much as 18·78 per cent., and the amount of deflection under load decreased by 13 per cent. As regards durability, frames made partly of vulcanised timber and partly of timber in its natural state have been found, after eight years' exposure, with the prepared timber sound and solid, but with the parts made of natural timber almost entirely rotted. The credentials of the process so far satisfied Mr. Tracy, late Secretary of the American Navy, that he recommended that vulcanised timber should be used in ships constructed for the United States Government.

The construction of cofferdams, both single wall and double wall, is well understood in America, and the fact that too small an enclosed area is false economy is well recognised. So, too, with the use of caissons, both the open and the iron cylinder form as well as the pneumatic caisson. In using this last device the vacuum method is seldom used, preference being almost universally given to the compressed air system. The use of pneumatic caissons is limited to

100 ft. in depth chiefly on account of the strain on the men's health from the pressure and the high temperature. The author's observation, from his own experience, on the causes of the deleterious effects often resulting from working in compressed air, and the best means of minimising these, deserve careful attention.

The Poetsch freezing process, though used largely in Europe, and in spite of its value for deep sinking through treacherous materials such as quicksand, has been employed only to a limited extent in America. For dealing with quicksand the expedient of introducing, by means of pipes, cementing material, and so consolidating the quicksand, has been successfully employed.

The enormous height to which modern buildings in Chicago are carried, and the difficult nature of the subsoil, have caused the subject of foundations for high buildings to assume considerable importance. For the buildings of the World's Fair a careful examination was made of the strata overlying the bed rock, and in many of the borings made the result appeared thus: upper surface black soil, then sand 5 ft. to 8 ft.; quicksand, 4 ft. to 10 ft.; soft clay, 6 ft. to 10 ft.; soft blue clay, 6 ft. to 10 ft.; blue clay; hard blue clay; hard pan. Average depth to hard pan 26 ft. to 36 ft. below surface. Such conditions necessarily require special precautions where great loads have to be carried on comparatively small areas. Where possible the practice has usually been to spread the foundations so as to limit the unit of pressure to 3,000 or 3,500 lb. per square foot. Piling has been tried, but has not been considered satisfactory, or even an improvement on the former method. It has been urged that pillars of stone with polished beds should be taken down to the bed rock, but the expense of such construction has been objected to, and spreading foundations of concrete and steel have been more favoured. These are made up of a bed of concrete at bottom then a layer of steel beams transversely to the wall crossed by a second layer at right angles, and these again by two other rows similarly disposed. The steel rails are encased in concrete, and the foundation so formed has the advantage of less weight and less height than a masonry construction of the same bed, so that an additional story is gained. Many of the lofty buildings of Chicago have foundations of this character, and no serious settlement has followed their adoption.

In the case of the City Hall of Kansas City, which stands on 50 ft. of made ground, another method has been adopted. Holes were bored by means of a large auger 4 ft. 6 in. diameter, an iron cylinder followed the auger. When a solid bottom was reached the cylinders were filled with vitrified brick well bonded. A somewhat similar method is proposed to be used in the foundations of the New Manhattan Life Building of New York. The caissons will be built of boiler plate steel, and will be from 10 to 15 ft. diameter. These will be sunk by the pneumatic method, and the piers will consist of hard-burnt bricks in Portland cement, capped with several courses of granite to receive the bed plates for the columns.

The volume is a valuable contribution to the list of practical treatises on this class of subject.

THE SWEDISH TIMBER INDUSTRY.—In view of the important rôle played by Swedish timber in our building industry trade, it may be of interest to mention that from statistics just issued it appears that one-half of the area of Sweden, 40,584,532 square kilometres, is covered with forest, principally pine and spruce. The public and crown forests cover 7,307,000 square kilometres, which last year yielded a revenue of only 85,000*l.*, or less than 4*d.* per kilometre. This pitiful result is due to the want of communication. The total value of the raw, sawn, and hewn timber exported from Sweden last year amounted to 6,200,000*l.*, and that of prepared wood-goods, building material, &c., to 1,320,000*l.*, making a total of 7,520,000*l.* Of this quantity, about two-thirds are imported into Great Britain.

BABYLONIAN BRICKWORK AND BRICK STAMPS.

THE discoveries made during the last few years in the ruins of the ancient cities of Chaldea have carried our knowledge back to a very remote antiquity, at the same time revealing many interesting and primitive customs.

The important results of the expedition of M. de Sarzec, which have so enriched the collections of the Louvre with the antiquities from Tello, the ancient Sirpurra, have now been supplemented by some most important archaeological finds made by the American expedition, sent out by the University of Chicago to explore the ruins of Nuffer, the ancient Nipur, in central Babylonia. One section of archaeology upon which these excavations in Chaldea have thrown much light is one of especial interest to the readers of the *Builder*, namely, the early customs and manner of brickmaking and the ceremonies connected with the laying of the foundation stones of buildings.

Babylonia was probably the land where the art of brickmaking originated—indeed, this seems to be implied by the Hebrew tradition of the building of Babel, "let us make brick" being the command on settlement on the plains of Shinar (*Sumir*), South Babylonia. This meets with confirmation in the inscriptions, for we find in the old Akkadian Pantheon a "God of Bricks," and a month, Sivan (May-June), called the "Month of Brickmaking," because it was the month when the alluvial clay deposits were sufficiently dry to make the bricks. As a month was named after the work of brickmaking, the custom must have been very old. Its antiquity is indicated by a curious passage in a very old creation tablet, which reads: "A brick had not been laid, a beam was not shaped," that is, no work of creation had begun. The God of Bricks was a very important one in the castles of Babylonia, and had as his companion the god Dullum, the "God of Work."

Babylonian bricks have been discovered during the last few years of very great antiquity, the oldest being those of Urnina and Entena, which bear only rudely scratched inscriptions, and these may be assigned to a date as remote as B.C. 4000 at least. The explorations of Dr. Peters and the American expedition at Nuffer have resulted in a very interesting discovery with regard to inscribed Babylonian bricks. Here they found several bricks bearing inscriptions of Sargon I. and Naram Sin, his son. The date of the reign of the latter of these monarchs is fixed beyond doubt as 3,200 years before the restoration of the great temple at Sippara by Nabonidus in B.C. 550, which gives him therefore an antiquity of B.C. 3750. Owing to the large number of bricks which had to be stamped with the name and titles of the king, or the name of the edifice, the Babylonian brickmakers had invented and introduced the use of the brick stamp. We

period, but in use in Babylonia before the time of the Great Pyramid.

The custom of stamping bricks, or writing inscriptions upon them, originated not only from the desire of the king to leave a memorial of himself, but also the inscription containing the name of a god acted as a charm to prevent evil from entering the interior of the building through the courses of brickwork. The work of building an edifice was one of great sanctity, and accompanied by many curious ceremonies. It must be on a fortunate day in a fortunate month. The proceedings are thus described on the inscriptions on the statue of Gudea, now in the Louvre:—"Her favourite temple he has constructed; the town he has purified and laid out; the table of offerings he has placed; the *kāl* he has caused to be brilliant; the clay (for the construction) from a holy place he has taken; the bricks in a holy place he has moulded; the brick platforms (tables) he has made; the dedicatory inscription he has given forth. Its foundation he has consecrated; the site he has made level; its line (course) he has marked out."

There were, of course, the usual sacrifices—libations of wine, oil, milk, and honey over the foundations, but there is no trace of the very ancient and prevalent custom of human sacrifice.

Among the inscriptions discovered by M. de Sarzec is a brick with a long inscription, which gives the account of the building of a city, and is important as showing the order of precedence of the different buildings; the inscription is translated numbering the buildings in their order. "Ur-nina king of Sirpurra, son of Nin-khaldu, the temple of Ningirsu (1) he made, the palace (2) he made, the temple of Nina (3) he made, the observatory he made, (4) his watch-tower (5) he made, the temple of he made, the house of seven spheres (6) he made, the burning-place (7) he made," &c. We have only quoted two columns, but those are sufficient to show the order of building. 1, the temple of the city god; 2, the palace of the king; 3, the temple of his own patron goddess, Nina; 4, the observatory; 5, the palace watch-tower 6, the seven stage towers; 7, the burning-place. This latter was a species of *ghat*, or burning-place where bodies were cremated, which seems to have been the mode of disposal of the dead in this city.

Thus we see how great evidence of antiquity, how much interesting matter, is to be gained from these recent explorations upon the history of brickmaking.

NOTES.



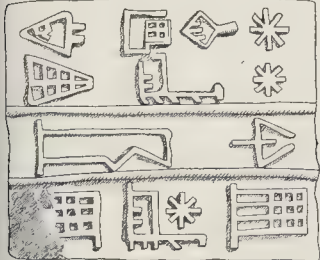
It may remind our readers who are interested in hygienic questions that the Eighth International Congress of Hygiene and Demography is to be held at Budapest in September of next year. We are officially informed that the preparations for the Congress are already well advanced; the papers in certain sections have already been selected, and about the beginning of next month it is expected that the series of questions and subjects for all the sections will be formally made out. We are glad to learn that the Executive Committee, acting in a truly practical spirit, are especially desirous to realise as far as possible the decisions come to at the London Congress, and special committees have been organised with the object of considering and giving effect to the decisions or resolutions approved at the general meeting in London.

It is much to be regretted that the Trades' Union Congress pass such a multitude of resolutions practically without discussion, the time allowed for proposing or seconding resolutions being limited to three minutes. Thus, on September 3 the Congress passed more than a dozen resolutions. The first was so lengthy that the three minutes of the mover must have been occupied in reading it.

It practically asked for any number of things from the Government in relation to Government contracts which would favour the workman at the expense of other members of the State. The Government was "to discontinue the sale of any disused Government stores in such a condition that they can be placed on the market to the detriment of the industrial classes." This is a sample of the utterly unpractical and selfish character of the resolution. The workman would prefer waste in the despatch of Government business if it would bring money into his pocket, rather than careful administration if even for a moment it delayed work coming to his hands. Again, the Government was asked to discontinue the employment of juveniles who supplant competent adults. An adult can always do the work of a lad, but if a lad can do it equally well at half the cost no man of business will employ the adult. Another resolution moved by Mr. Keir Hardie was to the effect that it is the first duty of the Government of the day to provide profitable employment for those workmen who are out of work. We should like to ask the members of the Congress who adopted the resolution why Government aid is to be given only to the so-called workmen who are out of employment. If the iron-worker is unemployed, and to be given work, why not the doctor or the journalist? Why also should the workman who by sobriety and energy obtains employment be taxed for the benefit of the inefficient workman? Many artisans appear to regard the State as a goldmine, whereas, of course, it is only another name for the collection of persons comprised in the nation. Asking the State for employment is only a grandiloquent form of begging alms from your neighbours who happen to be the members of the State earning money. If every member of the State demanded State employment the population would simply be preying on each other.

THE withdrawal by the Government of the Equalisation of Rates will be a disappointment to London. Though there is not unanimity on the details of the measure, there is a general consensus of opinion on the necessity of equalising the incidence of the rates throughout the metropolis. The measure was a short one, and would not have occupied much time in its progress through Parliament, and might easily have become law had the Government been willing to devote some small amount of time to something besides Home Rule. The loss of the Bill shows in some ways the drawbacks which attach to our system of Party Government, since this non-political measure is allowed to be pushed on one side by others which are considered likely to be more useful from a party point of view. Many Londoners will consider that their interests have not been sufficiently safeguarded by their members.

WE were much struck on a recent visit to the Portland stone quarries to find that enormous quantities of good stone are daily thrown away, whilst in some cases, on the other hand, a comparatively inferior material, from the point of view of durability, is sent to the market. The two strata known as the "roach bed" and the "whit bed" are not separated from each other by a divisional plane, but the former merges imperceptibly into the latter, and the quarrymen decide where the one begins and the other ends, in each working. Much of that included under the term "roach" is full of large holes, caused by the removal of shells by the action of percolating water; and this is not of much use for building, although exceedingly strong and suitable for rough sea walls, engineering purposes &c. A very large proportion of the "roach," however, especially near its junction with the "whit bed," is not so full of cavities; they



give a drawing of one bearing the inscription, "Naram-Sin, builder, of E-Mullil (temple of Bel)." These stamps are made of clay, and baked, and measure 11.75 x 12.08 x 2 centimetres. Thus we have the introduction of this custom known in Egypt at a later

only make their appearance here and there in the stone. This better class of "roach" is a very fair building stone, and eminently suitable for ashlar, though it could not be used for mouldings and the like. It is, moreover, very durable, as testified not only by its properties from a scientific standpoint, but by its behaviour in the walls of St. George's Church, Portland, erected in 1764, and in other buildings in the island. Indeed, we incline to the opinion that this rough-looking material is quite as durable as the best Portland stone. In most edifices where the "natural face" or "rustic face" of stone is left on the exposed surfaces this class of "roach" could be profitably employed. Yet tens of thousands of tons are annually wasted, because, we are informed, there is no demand for it. We feel sure that it has only to be better known to be extensively made use of.

SIR HERBERT MAXWELL has written an opportune letter to the *Times* on the subject of London trees, in regard to the effect of this exceptional summer upon them. Trees are necessary for the beautifying of London, but it is necessary that care should be taken to plant chiefly those which are found to flourish in the Metropolis. There is no more miserable sight than a tree struggling to live. But after all, this hot summer has only confirmed conclusions which have been arrived at by careful observers of tree life, not only in London, but in the dry southern counties. The plane has come well out of the ordeal, but this tree has for some time been recognised as that which is most suitable to the London soil and climate. That the horse chestnut and the lime have suffered severely might have been expected. The former likes a damp stiff soil, and both soil and temperature have been adverse to it; the lime every year is seen to shed its leaves earlier than other trees; the fine summer has but accelerated their fall. Again, the alantus—"The tree of heaven" (not "the tree of the Gods," as called by Sir Herbert), and the so-called acacia, have done well, but here again the reason is obvious; these trees like a dry soil, and a tree which enjoys a dry soil is actually benefited by a dry summer. The moral is clear. Let the authorities plant in numbers the plane and other trees which have been proved to bear well the dry London climate; but at the same time they should not neglect entirely those trees which do not grow vigorously in the Metropolis; the latter with attention in the planting may grow fairly well, and they add to the variety of the foliage; but they must only be used as accessories to the main body of what may be called London living trees.

THE Fortieth Report of the Department of Science and Art gives us, among much other information, extracts from the opinions of the examiners on the work of the students in various classes. Mr. L. W. F. Day considers the design of ornament to be the point in which the students seem weakest, though it comes up this year to the average of former years. He observes that there appears to be a mistaken idea on the part of students that a design with beasts, birds, or human figures in it is more worthy than mere ornament, whereas even good figures may be quite out of place in ornament unless they help the design, and the students seem to put them in with no object of that kind, merely to fill up a space. In elementary architecture the examiner, Professor Roger Smith, considers the work done by those who have obtained good marks as satisfactory (it is to be hoped so, or why would they have the "good marks"?), but he can hardly say as much of those who have failed to pass or only just passed: in other words, we presume, there are a few good drawings and a great many bad ones. Our own impression from looking at the prize drawings from year to year is that the architectural students

want pulling up very much, and that examiners are too indulgent. In architectural design the same verdict seems to be passed; a few good, a majority very bad. In Principles of Ornament Professor Aitchison reports the advanced stage papers as very creditable, but there is "an inclination to make designs without regard to the material in which they are to be executed." He recommends that all beginners studying the principles of ornament should go through an elementary course of geometry; "that would enable them to draw the best-known forms and curves and the various network of simple geometrical figures that will fill spaces that are wanted for diapers, and the foundation for repeating ornament." In regard to Historic Ornament Mr. J. Hungerford Pollen reports well of the work of the students; the number of candidates is much smaller than last year, but the quality of the papers is higher. In the various departments of modelling a generally prevalent improvement is noticed, but the examiners (Messrs. Armstead, Brock, Thornycroft, and Onslow Ford) report that in "Design with Figure" "there is a preponderance of work based largely on the employment of Renaissance scrolls," a criticism which certainly cannot be confined to the students of the Science and Art Department. In the design for carpets, hangings &c. Messrs. W. Morris, Lewis Day, and Alan S. Cole report a decided falling off in quality, and in the class of cotton hangings and prints "no gold medal has been awarded" this year, which, considering the generous manner in which medals are usually showered around, seems to say a good deal. There appears to be a special set of reports on the works which have received medals, from which we learn that many of the studies sent for Historic ornament are too careless in execution, and in regard to architectural design it is noted (and very rightly) that the examiners "would like to see some of the mouldings drawn full size and accompanied by perspective sketches of them to a smaller scale showing the actual effect of light and shadow." There could be no better study.

A PAMPHLET by Sir Spencer Wells on "Cremation and Cholera" (a reprint of a recently published magazine article) deals with other matters besides cremation, and we reprint from it one paragraph containing some recommendations which are not of course new to most of our readers, but perhaps cannot well be too often repeated:—

"The house-cistern may be another source of danger to which every household is exposed so long as the supply is only daily, not constant. If the water-companies obtained their supply from sources not liable to pollution, neither filtration nor boiling would be necessary. But then there should be a constant service, and no house-cistern in which the water might become impure after it had been delivered. With only a daily service into a house-cistern, stirring up any deposit every time the water comes into the cistern, every house should have its own filter. But if the filter is not pure it is worse than useless. Water that passes through a dirty filter is worse than unfiltered water. Therefore the porous part of every filter should be movable, and be boiled for ten minutes once a week. Boiling all water after filtration for five minutes is an additional and often a necessary precaution, and in all epidemics of such spreading diseases as are carried by water, like typhoid fever or cholera, it is advisable to boil all drinking water for fully five minutes, and all milk which may have been diluted or adulterated by the addition of water. A constant supply of pure water being the most certain means of checking the spread of such infective diseases, the first demand should be in all towns for purer water than can be had from any river, however well the water may be filtered. Next, we must have a constant supply of it, and abolish all house-cisterns."

Sir Spencer Wells's instances, in regard to cremation, of the cases in which the outbreak of disease has been distinctly traced to the disinterment of buried remains, are very strong; so strong that on the face of these

statements by themselves it might be said that the enforcement of cremation was a State duty. Other medical authorities, however, differ as to sanitary effects of cremation, and it is no part of our business to express any decisive opinion on questions which are mainly medical. Our impression is that cremation is likely to be much more widely accepted as a method of disposing of the dead, but a decisive opinion is only to be formed after a dispassionate consideration of all the evidence that can be collected from all sides in regard to the sanitary effects of different methods of burial; and this evidence is not to be had in any generally available form at present. In the meantime we may note Sir Spencer Wells's emphatic declaration that "it is in vain to hope for the abolition of cholera if its bacilli are still to be preserved by burying in the earth the bodies of the victims": a dictum which certainly ought at least to be carefully weighed and considered by sanitary authorities.

NOS. 28 to 31, Southampton-street, Strand, have been pulled down and are now being rebuilt; Nos. 30 and 31, after the designs of Mr. J. T. Woodard, architect, and the other after those of Mr. J. Randall Vining, architect. No. 30, at the corner (south) of Maiden-lane, on the Duke of Bedford's estate, was occupied by Messrs. William Dart & Co., successors to Godfrey & Cooke (No. 31), established in 1680, and claiming to represent the earliest still existing druggist and chemist's business in London. We learn that some photographs were taken of No. 31, and of its old parlour and laboratory. The street's name commemorates the marriage of Lady Rachael, the fourth Earl of Southampton's daughter, and William, Lord Russell, son of the fifth Earl of Bedford, whose ancestor had built Bedford House on this site, on quitting Carlisle, or Russell, House, on the Strand's south side. Southampton-street has been the home of Mrs. Oldfield, actress, and, in the winter of 1714-15, of Colley Cibber. On the west side is No. 27, into which Garrick moved from King-street, Covent Garden, on his marriage. It is the house from which Dr. Johnson was seen touching the posts, according to his wont, as he walked down Tavistock-street on his way to dine with Garrick in Southampton-street. Another old landmark in this neighbourhood will, we understand, disappear shortly. It is Ivy-lane, at No. 76, Strand, the "Club Café," between Adam and Salisbury streets, whose steep descent led, until recently, down to the "Fox-under-the-Hill," where, as our more elderly readers may recollect, passengers used to embark in the steam-boats, at 3d. fares, for London Bridge. The old-fashioned riverside tavern was removed for the laying out the Salisbury Estate by Messrs. J. W. Hobbs & Co., Limited, contractors, after Messrs. Perry & Reed's designs—as described and illustrated in our columns of October 20, 1888, and February 21, 1891. Ivy-lane, which will be absorbed in course of the works, consisted rather of a line of short tunnels, darkened by rooms across it of the houses on each side. The gateway into the Strand has been closed for some years past. Stow records:—

Ivy bridge in the high street [Strand] which had a way under it leading down to the Thames, the like as sometime had the Strand bridge, is now taken down, but the lane remaineth as afore, or better, and pertaineth the liberty of the Duchy of Lancaster, the Savoy, and the city of Westminster on that south side.

Next west stood the Bishops of Durham's "inn," next east was the house which Sir Robert Cecil (afterwards Earl of Salisbury) built, in 1602, next to what had been the "inn" of the Bishops of Carlisle, belonging to the Earl of Bedford. The little brook Ulebrig, rising in the Cock-and-Pye fields, flowed beneath Ivy Bridge. Strand Bridge was opposite Duchy-court, a little westward of the south end of Catherine-street.

THE vestry of St. George, Hanover-square, propose to lay out and put into decent repair their disused burial-ground in Hyde Park-place, Bayswater-road. Acquired in 1764, and extending over five acres, most of the ground has been for some while past in a sorry state of neglect. For about one-half of its length it is divided into three portions by two dwarf walls; the central portion is less crowded with graves, is better cared for, and the vaults are bricked; the northern half has but few stones. The spot of Sterne's interment here does not seem to be known, and by one account, his body was taken away to a dissection-school at Cambridge, where it was at once recognised. So says Malone: see Sir James Prior's "Life of Edmond Malone" (1860). The present head-stone, beneath a sycamore tree, near tablet "7" on the west outer wall, was set up, near his supposed grave, by "two brother Masons," who "rejoice in this opportunity of perpetuating his high and irreproachable character to after ages. W. S." The inscription says Sterne died on September 13, 1768; as a fact he died on March 18 of that year, in his lodgings at the silk-bag maker's shop (No. 41) in Old Bond-street. Here, too, were buried J. T. Smith (1833), Paul Sandby (1809), and Mrs. Radcliffe (1823). In a vault beneath the chapel, rebuilt last year, by Mr. Herbert P. Horne, was buried General Sir Thomas Picton (his remains since removed into the crypt of St. Paul's): in the old chapel we saw the monument of John Webber who, as draughtsman, accompanied Captain Cook on his second voyage of discovery. The vestry will apply for a faculty to enable them to improve the ground, and to remove or alter the position of the monuments.

IN the *Sydney Morning Herald* for July 29, we have a verbatim report of a very good paper read by Mr. G. Allen Mansfield at a meeting of the Sydney Institute of Architects, under the title "The Architect, the Engineer, and the Contractor." In the course of the paper Mr. Mansfield touched on the subject of the new style of American iron frame buildings, in which the stone walls are a mere casing unconnected with the real structure. He observed:—

"Before quitting altogether the subject of co-operation between architects and engineers it may not be out of place to refer briefly to the new development of building construction which is now going on in America, where iron and steel are made to form so large a proportion of the structure that all the rest sinks into comparative insignificance. I admit that I have yet much to learn about the details of this new system, which seems to treat the building as composed chiefly of an elaborate structure of iron framing and columns, with concrete floors, and to regard the walls as a mere skin to enclose them, but I cannot bring myself to feel that this is the spirit in which the creation of any great building should be approached. From an architectural point of view, it is impossible to believe that any realisation of beauty, grace, or grandeur can result from such a cold-blooded treatment of materials. It is certainly devoid of all poetry and of all sentiment, and to rob architecture of the poetry and the sentiment which lend a charm to so many of the triumphs is to dethrone her from her high estate, to disestablish her as an art, and to relegate her to the rank and file of the mechanical crafts."

We have already very decisively expressed the same opinion, and are glad to find an answering sentiment from the other side of the globe.

WE frequently receive from indignant architects copies of circulars sent to them offering them commissions for using this or that article in their buildings, but the Incandescent Gas Company seem to have fairly beaten the record in this kind of insult to the architectural profession. They have addressed a circular to members of the architectural profession kindly informing them that "although we do not want you to stock our goods or to sell them directly to your customers, there is yet a *very easy way of securing some very substantial profits* [this in italics] by your recommending this light."

There follows an offer to collect the payment from all customers recommended by the person to whom the circular is sent, and pay 20 per cent. commission either immediately or at the end of each month, and the suggestion that "it is obvious that you can push this light more effectually amongst your friends and customers if you were to light up your offices and warehouses with these burners," and the document concludes as follows (the italics are in the original):—

"It is needless to say that the fact of you yourself having adopted this system in your establishment would give confidence to all your customers, and would induce them more readily to adopt it and to place an order with you for us. I beg you to give this matter your careful consideration, and I have no doubt that such an arrangement would be a good source of profit to yourself if you follow out the advice given in this letter, and in case you should require further advice or any support in pushing the lights, we are prepared to assist you as far as we can. I shall be pleased to hear your opinion about this proposal, and I beg you to let me know whether you are inclined to light up your establishment with our burners, and I can assure you that I shall do everything to assist you in pushing the burners amongst your friends as much as I can, and I have no doubt whatever that the proposed arrangement will be a highly satisfactory one for both of us."

Can it be believed that this has actually been sent to architects holding a high place in the "profession or art" of architecture? From some parts of the wording of the circular we imagine it was not originally intended specially for the benefit of architects, but that the manager of a company of this kind should be so utterly ignorant of the status and principles of professional men as to insult them with such a circular seems almost incredible.

BUILDING MATERIALS AT THE CHICAGO EXHIBITION.

THE architect who journeys to Chicago in search of new materials, appliances, methods, and ideas, will speedily discover that, were this the sole object of his visit, he would have done better had he remained at home.

Amazingly large as the Exhibition is in very many particulars, it is notoriously incomplete in architecture, using that word as covering every art and industry directly relating to architecture, and which thus includes building materials, methods of construction, illustrations of the trades and industries dependent upon architecture or concerned in any way with the production of buildings, as well as the more artistic side illustrated in the architect's drawings and personal work. Such an exhibition might most advantageously have been included in the scope of an Exhibition which embraces special buildings for Horticulture, Transportation, and Forestry. A horticultural hall is no new adjunct to an international exhibition, though its practical utility, a quality quite distinct from its artistic and popular value, may be doubted. But the Chicago Exhibition is the first to give a structure of the first-class to "Transportation," and the department of Forestry receives here very full and unusual illustration. The time will doubtless come, if we have not had a surfeit of international exhibitions, when an Architectural Building, that will provide accommodation for the whole subject, artistic as well as practical, will be considered as much a matter of course as a manufacturer's building or an art gallery.

Some idea of the lack of system shown in the installation of exhibits concerned with architecture may be gathered from a brief review of the location of the exhibits. First of all, the architectural drawings are in the Fine Arts Palace, where, as architectural drawings are most generally considered, they should properly be found. The effort to keep all the drawings together has only been partially successful, so that the disintegration of the architectural exhibits may be said to begin at the beginning. Building materials, stones, clays, bricks and the like, are mostly in the Mines and Mining Building. Here, at all events, the largest part of the American display has been placed, and here, according to the classification, they ought properly to be. But one is only certain to find the American materials in this building, for many foreign countries are not represented in it at all, and whatever they may have to show in materials must be looked for in other buildings. The only guide to location is the ascertaining of what building contains the most numer-

ous exhibits from the particular country we may be in search of. Generally, it is the Manufactures Building, but one can only feel certain after a personal inspection.

The Manufactures and Liberal Arts Building contains a variety of exhibits which have an architectural interest. A section in the North Gallery contains a miscellaneous exhibit, such as paints, lathing, window fixtures, and the like, while skylights and a few architectural drawings are close at hand. It is a most depressing collection, because of its incompleteness and diversity, though several of the exhibits are of the highest interest. The galleries of this building also contain all the educational exhibits of the Exhibition, and the student in search of illustrations of architectural study in America—for foreign countries make little show here, though several well-known English and German schools are represented—will find much of interest, though almost lost in the enormous mass of educational exhibits, apparently coming from every school and college in America. Downstairs, on the main floor, the great department of Manufactures is placed, and here will be found the bulk of the more general exhibits. As is quite natural, the American section is the largest, and fills nearly half the area. Several sections, separated almost as widely as possible, illustrate architectural subjects. In the north-west corner various constructive exhibits have been placed, including bricks, building tiles, artificial stones, fireproofing materials, and the like, and a large variety of roofing materials and devices. The pilgrim in search of architectural subjects must walk half the length of the building before he reaches the sanitary section. This is not very large, nor do the exhibits include much that is new, but their examination must be postponed for the present. A further instalment of sanitary exhibits is to be found in the Anthropology Building, located in one of the most distant corners of the ground.

This only relates to the American section, for the building exhibits of the foreign countries are, as a matter of course, only to be found in their respective enclosures, so that one actually has to traverse this gigantic structure from end to end with many side detours, before being satisfied that everything the Exhibition has to show in one's own speciality has been seen.

The Forestry Building, as might be expected, includes a good deal which is of interest to the architect. The display of woods is very fine, though arranged more from a forestry standpoint than with regard to architectural application. But the exhibits are extremely well arranged, and this is one of the few departments of the Exhibition that may be unstintingly praised for its completeness. A few exhibits of architectural interest are in the Electricity Building, though they are of no great importance to the architect; but the contents of the building are of the greatest interest to the electrician. Several exhibits of elevators are to be found in the Transportation Building, though other exhibits of this sort may be found in a number of the other buildings. Primitive architecture has some illustrations in the Anthropology Building, and near it have been erected some models and reproductions of primitive American architecture. Further illustrations of the same sort are provided by the villages and model structures of various uncivilised peoples which help to make up the marvellous miscellaneous annexe of the exhibition called, from its location, the Midway Plaisance.

But the architectural student has not exhausted his subject when all these buildings and localities have been visited. Several nations, of which Sweden, Brazil, and Costa Rica are conspicuous examples, have placed the whole of their exhibits in their own special building erected upon the grounds, so that if one would be positively certain he has seen everything of architectural interest, the smallest as well as the greatest, a half-dozen or so of the smaller buildings must be examined. The inconvenience of this arrangement is not affected by the fact that few of these buildings contain anything of architectural value. No unity of architectural exhibits having been attempted, the full force of this lack of arrangement can only be understood when the whole situation has been surveyed. The foreign buildings do not complete the list of structures the architect must visit, for several of the American States have filled their State buildings with their products, and further visitations and investigations are needful. It is true one is scarcely likely to find in these buildings anything but samples of building materials, either woods or stones, but these must be looked at if one would conscientiously ascertain the real extent of the architectural display. Several of the

State buildings are intended to be illustrations of the peculiar architecture or customs of the different States. This idea has only been partially carried out, since many of the States having similar resources and climate, with a population of identical character, no opportunity for individualism in building presented itself. Some of the far Western States attempt to illustrate their products in the construction of their buildings, but the experiments have not been, as a whole, successful.

The relative importance of the exhibits that may be roughly classed as building materials, may be gathered from the fact that the British exhibits under this head comprise three exhibitors, none of whom make an important display. Great Britain is worse off than any other great foreign country in this respect, yet discreditable as this meagre showing is to British pride and energy, it should not be hastily condemned. No individual or firm makes an exhibit at an international exhibition save for the hope of a financial return. In other words, though of very great educational value, they are, in practice, advertising mediums. It is because of the large advertising received from an effective and striking display, and the advertising value of medals and diplomas, that people are willing to spend thousands of pounds in preparing for a single exhibition. Now while in many departments of manufactures British producers might be amply compensated for bringing their goods before the American public, there can be little market in America for building materials, though our tiles have a large sale there. But the British tiles sold in America are more properly ornamental than constructive in nature, and hence scarcely come under the head of building materials. The United States is itself so abundantly supplied with building stones and clays that the absence of any considerable number of British exhibitors in this department is only natural.

It is much the same with other countries; unless there is some financial return likely to accrue to the exhibitor there is no inducement for private firms to make extended and costly displays of their goods. Thus it follows that, with the exception of the American section, there is little of interest or of value in any of the foreign contributions to architecture. In building materials scarcely anything is shown but ornamental marble and high-priced or rare stones, and these chiefly in small quantities.

The single exception to this almost total absence of European building materials is Portland cement, specimens of which are shown from almost every country of Europe. A few of these exhibits are tastefully arranged, but most of them are without any special interest. A notable exception is the exhibit made by the "Société Anonyme des Ciments Français et des Portland," of Boulogne-sur-Mer and Desvres, located in the Mines and Mining Building. Special mention should be made of a Portland cement drain-pipe, 18 in. in diameter, with an inner glazed surface. The glazing is beautifully done, very strong and deep, and although but one or two specimens are shown, it is one of the most striking exhibits in this department. Another notable exhibit is that made by Manske & Co., of Germania Portland cement. This firm has erected a large pavilion wholly of their product, but which is somewhat unfortunately placed behind the Machinery Hall, where it is not well seen. The "Société Anonyme Carrières et Fours à Chaux et à Ciments du Coucou," of Belgium, have an extended display in the Belgian section, strangely enough catalogued as in the Mines and Mining Building though actually located in the Manufactures Building. This establishment sends, among other things, an extended line of very bad cement statuary.

Although the larger European countries show very little in constructive architecture, Belgium is a notable exception. Several fine exhibits of marbles are shown in the Manufactures Building. The most extensive is that made by the "Société Anonyme de Marbres-le-Château." This firm makes an exceedingly fine and varied display of marble slabs, all of uniform size, polished and labelled, and of the very widest range of colour. The Société Marbrière Namuroise, of Senzeikles, near Cerfontaine, also make an interesting display, chiefly of brown, black, and white marbles. There are several other smaller collections of black marble. On the whole, this display is very good and interesting, though offering nothing novel, and it stands in delightful contrast with the meagre displays made by the larger countries of Europe. Belgium is also the only country that sends any considerable quantity of window-glass, it may be noted, in passing. Some of the plates are of great size and beauty,

though their situation, immediately under a gallery, is not at all good. Stained glass is, of course, shown in other countries, as it is in a few specimens from Belgium; but this latter country is the only one that has made any special effort to send plain window-glass.

New South Wales is the only colony that makes any considerable showing at Chicago, and, strangely enough, it is one of the few countries that has made any pretence at presenting a summary of its natural resources in a complete and intelligible manner. The display is very complete and may well serve to give thoughtful Americans an insight into the boundless resources of our Australian possessions. The exhibit of building stones is particularly full. This includes granites, syenites, sandstones, limestones, and marbles, and is supplemented by collections of artificial paving stones, bricks, and brick-making clays, and a white pottery clay used in brick-making.

The collection fairly illustrates the resources of the colony in building materials. From the Hunter River District granites and sandstones are shown. The granite is grey; the sandstones have a good variety of colour, including white, buff, grey, green, yellow, and brown. The stones from Pyrmont, near Sydney, comprise granites, syenites, and sandstones. The syenite is shown rough and polished; the sandstone occurs in pink and other colours. Marbles are from various districts, chiefly from Moonbi, Mullion, and Marulan. These are very large slabs, though, as the quarries have not yet been developed, and the specimens were taken from the surface, they do not exhibit the evenness of texture that is expected to develop further down. The range of colour is extremely good, including pink, white, and black and white, all being considerably diversified. These marbles make the most interesting feature of the mineral display from New South Wales. A singular coal formation is shown, with sandstone of different colours on either side of the central seam of coal. The lesser building materials include bricks and brick-making clays; the bricks are very heavy. A white brick, made from a pottery clay by J. Forsyth & Sons, of North Willoughby, is worthy of mention. These bricks are not enamelled, though the material is used in that form also. The collection comprises, further, several exhibits of paint. It may be mentioned that the New South Wales section in the Manufactures Building contains some large photographs of buildings in Sydney built from the stone that abounds in the immediate vicinity of that city.

This almost concludes the contributions to building materials made by others than American exhibitors at the Columbian Exhibition. Mexico sends some specimens of onyx, which is used to a considerable extent in America for rich internal effects, but the specimens are, as a rule, small. A novel stone for interior decoration is the "Rose Garnet" from the same country. It is a silicate of lime and alumina, and is described as harder than granite. It will take a high polish, and is shown in several slabs. The ground is white mottled with pink of various shades. Tiles are shown by a number of nations. Japan, Germany, and France send a few, but those from the first two countries are insignificant, though the German art tiles in the Manufactures Building are sufficiently numerous in point of numbers. England is well represented in this department, but these exhibits scarcely come under the head of building materials as we are studying them, and they may, therefore, be neglected for the present.

The department of building materials would be scandalously small and insignificant were it not for the American collections. These are housed chiefly in the Mines and Mining Building, though several of the States make individual displays in their own State buildings. The collections are arranged under two general heads. A comprehensive collection of the building stones of the United States, formed under the direction of the Department of Mines, Mining, and Metallurgy of the Exhibition, has been placed in the gallery of the Mines and Mining Building. It forms a collection distinct in itself. The second division under which these exhibits may be conveniently classed, is composed of the State exhibits, housed in the same structure, and placed on the main floor. In addition to these two chief divisions, a third might be said to include exhibits made by individual exhibitors. These are few in number, and the exhibits are of minor importance.

The general collection, formed under the direction of the Exhibition authorities, is very complete and very good in its way. The specimens are of uniform size, polished wherever

possible or necessary to show their constructive value, neatly arranged, and labelled with their names, common and technical, source of origin, name of person contributing the specimen, and similar data. This, of course, is highly interesting and of considerable importance, but it is very far from affording any satisfactory information to the architect. There is nothing whereby one can learn the physical properties of the stones, or which would enable one to determine which of two similar stones he would use for some specific building work. In other words, while this collection has been made as a collection of building stones, with their economic value strictly in view, and has been formed with the idea of illustrating the entire stone products of the United States, it contains absolutely nothing that would make it of practical value to the architect or builder. It is simply so many cubes of variously-coloured stones, marked with their individual names and localities, very pretty to look at, very complete so far as generally covering the country is concerned, but absolutely worthless, in its present shape, for practical study. A fair collection of marbles, granites, &c., are also shown by the Ward Natural Science Establishment of Rochester, New York, arranged for schools.

A strange fatality follows the architectural exhibits in every department. The Exhibition authorities are giving special attention to the subject of coal, carrying on extensive experiments and preparing tabulated results of their work, which will be of the utmost value in the future development of the coal industry in America. Other collective exhibits in the Department of Mines, mining and metallurgy are similarly useful or self-explanatory, owing to the thoroughness with which the exhibits have been formed. But architecture and the subjects dependent on it sadly feel the want of an administrative mind which should turn such exhibits as may be complete, as that of building stones is to a considerable extent, to some practical value. A brief handbook, giving some technical information as to the building stones of the United States, with special reference to the present collection, would have been of the utmost value, and would have enabled the immense resources of America in this field to be appreciated and understood by those interested in the subject.

Downstairs on the main floor things are little better. The larger part of the American section of the Mines and Mining Building is taken up with displays of the resources of the different States, prepared under the direction of the various State commissions. There are thus very few individual exhibitors, a circumstance not in the least to be regretted, since most of the State displays are fairly complete, and illustrate the mineral products much better than had the matter been left to chance exhibitors who would have sent such goods as they were placing upon the market, without a thought of illustrating State products. In this respect, therefore, the Mines and Mining Building is one of the most interesting in the Exhibition, since it is one of the few in which some attempt has been made to prepare comprehensive exhibits with special reference to the subject as a whole, whatever its individual bearings may be. Building stones are, of course, but a single one of the many features shown by the State, mineral products and ores occupying the most space; and they nevertheless form a good part of the displays, and, taken as a whole, they make a very effective illustration of the great and abundant resources of the America.

(To be Continued.)

REPAVING THE STRAND. We are informed that the "Wells Light" is being used by the St. Martin's Vestry in connexion with the work of repaving the Strand from Trafalgar-square to Burleigh-street. It is now some four years since this part of the Strand was paved, and it then took nearly two months, but Mr. Mason, the Vestry Surveyor, has undertaken to complete the work in three weeks.

THE COLOR OF WALLPAPER AND THE STRENGTH OF ILLUMINANTS. According to the Copenhagen *Dagblad*, Dr. Svingner, physicist, has made some interesting experiments with respect to the effect of the colour of the wallpaper on the strength of gas-light. As unit he chose the intensity of the illuminant in a room entirely covered in black, and equal to 100 candle-power. The corresponding figures were:—Dark brown paper, 87 candle-power; unstained wood, 80; blue paper, 72; light yellow oil colour, 66; yellow-grey paper, 20; and for white-wash, 15 candle-power. The figures should, therefore, indicate that in a whitewashed room the same amount of light would be obtained from a jet of gas as in one covered with brown paper, with only one-fourth part of the consumption.

MR. FAIJA ON PORTLAND CEMENT.

We extract the following from the paper on Portland Cement read by Mr. H. Faija at the International Engineering Congress in connexion with the Chicago Exhibition in the first week of August:

"The economical grinding of cement has lately attracted the attention of a great number of inventors, and mills or grinding machines of almost every conceivable design and principle have been patented, but whether any of these will survive and eventually supersede millstones is a very problematical matter. The two principles which have perhaps attracted the greatest attention are those of edge-runners and ball mills, and the economy in power by both these principles over ordinary millstones is very considerable, and the cost of repairs and maintenance is also, in most cases, considerably reduced; but whether the grinding is as efficient is another question altogether. Mere fineness does not satisfy the question, as a cement may be ground to an equal fineness in two different mills, and yet one will be all grit and the other all flour; and the more floury nature a cement is, the better will be the results obtained with it, both in the testing room and in actual practice; and undoubtedly no grinding machine that has as yet been invented will produce the same percentage of flour on equal grinding as the ordinary millstone. Mills on the ball principle give better results than those on the edge-runner principle, but are not so efficient as millstones.

The power consumed by the several principles, reduced to the production of one ton of cement per hour, may be approximately stated to be as follows:—

For millstones ... 30 to 32 i.h.p. per ton per hour.
Ball principle ... 16 to 18 i.h.p. per ton per hour.
Edge-runner principle 12 to 14 i.h.p. per ton per hour.

In each case the cement being ground to a fineness of about 5 per cent. residue on a 50 by 50 sieve, and it will thus be seen that the power required is proportionate to the amount of flour produced.

The great objection to millstones, from a manufacturer's point of view, is the great expense entailed in dressing them, as in a hurst of four pairs of stones, one pair will always have to be up being dressed, and there is therefore, not only the expense of dressing, but there is the increased capital charge in requiring four mills to do the work of three. It seems possible, though the author has not had the opportunity of trying it, that by giving the millstones a fine dress with a considerable depth of face, the first grinding of the cement might be effected in one or other of the grinding machines and finished only in the millstones.

Before leaving the subject of the manufacture of cement, the author would like to point out to manufacturers, or intending manufacturers, the necessity and great advantages of having ample warehouse room for the finished cement. Very few cements are fit for use immediately they are ground, and all cements are improved by judicious and careful warehousing. Not only, therefore, is a manufacture improved by having ample warehouse room, but ample warehouse room enables the manufacturer to continue manufacturing his full output, even when his sales may for the moment be a little slack.

One of the peculiarities of Portland cement is, that if its components are improperly proportioned, or its manufacture has not been properly carried out, it may have a tendency after being gauged and mixed with water, to crack, expand, or disintegrate and fall into powder. This peculiarity is known under the cognomen of 'blowing,' and when a cement is said to 'blow' or to be a 'blowey cement,' it means that after the cement has been used it expands, cracks, or disintegrates, destroying the work in which it has been used.

The cracks, however, which are seen in concrete work are not always due to the use of a 'blowey cement,' but may be due to constructional causes, or to the expansion and contraction of the structure due to variations in temperature, or to the natural contraction of the mass; and a simple crack in a piece of concrete would hardly be indicative of a 'blowey cement' unless accompanied by other indications such as friability or absolute disintegration.

Concrete or mortar, again, may disintegrate, crack, and fall to pieces from other causes than the use of a 'blowey cement.' There are certain matters often present in aggregates which, by not allowing the cement to set properly, are antagonistic to the production of a sound concrete or

mortar: the principal of these are dirt and loam, and there is no doubt in numerous instances the cement has been blamed when the real fault has been either that the aggregate with which it was used was dirty or unsuitable, or that the concrete or mortar had been improperly manipulated; and a user of cement should be as careful in his choice of aggregate, sand, and water as he is in his choice of cement. The best aggregates are those which, while having ample strength, are somewhat irregular in form, and slightly porous, and which has been carefully and thoroughly washed before being used. The scope of this paper, however, does not extend to the choice of aggregates and the manufacture of concrete, but as these, if improperly selected and manipulated, may cause a failure, irrespective of the quality of the cement, it seemed necessary to allude to the subject.

Returning, however, to the subject, a cement may blow within a few hours of its being gauged, or it may not blow until several months afterwards. A cement may blow when it is very fresh and newly ground, and will lose that tendency after it has become aged. Some cements will blow whether they are new or old.

The cause of 'blowing' in a cement is generally due to an excess of lime in its composition, or to an imperfect combination of the lime with the silica and alumina. It may, however, be due to other causes, as for instance, to the presence of other basic materials unduly entering into the composition of the cement by the use of improper raw materials. One of these, magnesia, created a considerable scare a few years ago. Sulphate of lime or gypsum is another, which although it has not attracted the attention of users like magnesia, is more often found in cements, and when in any considerable quantity, undoubtedly has a very great power of rendering a cement blowey. As previously stated, it is hardly fair to the user that he should be required to make himself *au fait* on the several causes which constitute a blowey cement, it should be enough for him to determine, and be able to ascertain whether or no a cement is blowey, and leave it to the manufacturer to properly compound the cement, and correct his manufacture.

Several means have from time to time been devised for ascertaining within the limits of time of an ordinary test whether or no a cement is absolutely sound, and that process or test which was devised by the author some fourteen years ago is now in general use. The apparatus in which the test is carried out, and the means of carrying out the test, are fully described in the Proceedings of the American Society of Civil Engineers, Vol. XVII, November, 1887, in a paper which the author had the honour of communicating to that Society, headed "Portland Cement Testing." Briefly, it is a vessel containing water, the water being maintained at an even temperature of about 110 deg. to 115 deg. Fahr.; there is a cover to the vessel so that above the water there is a moist atmosphere which has a temperature of about 100 deg. Fahr.

The manner of carrying out the test is by making a pat on a small piece of glass; immediately the pat is gauged it is placed on a rack in the upper part of the vessel, and is there acted upon by the warm vapour rising from the hot water; when the pat is set quite hard it is taken off the rack and put bodily into the water, which, as has already been stated, is maintained at a temperature of from 110 deg. to 115 deg. Fahr., and in the course of twenty-four hours it is taken out and examined, and if found then to be quite hard and firmly attached to the glass, the cement may at once be pronounced sound and perfectly safe to use; if, however, the pat has come off the glass and shows cracks or friability on the edges, or is much curved on the under side, it may at once be decided that the cement in its present condition is not fit for use; the blowing however may only be due to the extreme freshness of the sample, and though a cement in its fresh condition is unfit to use, it may be a perfectly good cement when aged, and in order that a cement should not be condemned unjustly it is advisable, in the event of a cement showing a tendency to blow on the first experiment, to lay some of it out in a very thin layer on a tray, so that it may be thoroughly cooled, and in the course of a few days another pat should be made and treated in a similar manner; if this pat goes through the ordeal successfully, and is perfectly sound, it may be fairly assumed that the cement only requires ageing to be a perfectly useful one, if on the other hand the second test proves unsatisfactory, it would not be advisable to use the cement. A cement may show indications of blowing while it is on the rack in the moist heat of the vessel; if

this happens it is needless to say that no corroborative test is required, the cement must be absolutely worthless.

The ordinary practice of carrying out this test, is to make the pats in the morning, at say ten or eleven o'clock, and to place them in the upper part of the vessel, and before leaving in the afternoon, say at 5 o'clock, to put them in the water underneath, and to examine them for soundness the next morning, so that in twenty-four hours after the receipt of a sample its soundness may be known; and the author feels sure that both users and manufacturers will agree with him in the importance and value of the test.

It is hardly possible to dismiss the subject of the soundness of cement, without reverting to a test that was suggested some three years ago by M. Deval, and which was reported upon by M. De Chatelaine, and known as the "hot test." It consisted in gauging briquettes in the ordinary way, either neat or with sand, and when they were set, placing them in water which was kept at a temperature of 80 deg. C. (176, about 177 deg. Fahr.), and it was maintained that by so treating a briquette, the strength due to twenty-eight days, as carried out in the ordinary way, was attained by this method in considerably less time, and thereby the constructive value of a cement could be more quickly ascertained. It was also maintained that this treatment of a cement determined whether it was a sound cement or not, for if the briquettes did not stand this excessive temperature but cracked or became soft, then it was asserted that the cement was an unsound one.

When the author devised his apparatus for determining the soundness of a cement, which has already been described, he naturally had to make a great number of experiments before deciding on a temperature which it was advisable to adopt, and he then found that although some cements would bear being almost boiled, many cements that were in every respect good and sound cements would not stand the moist atmosphere, and subsequent warm bath if the temperature was higher than that which he adopts, viz.:—116 deg. Fahr. for the bath; he therefore, when M. Deval's test was made public, made a long series of experiments to satisfy himself that he had made no false deduction in his previous experiments. The conclusion which he had arrived at after these experiments with the "hot test" were the following:—

- 1.—That if a cement was really blowey his own apparatus showed it equally with the hot test.
- 2.—That the induration of a good cement was hastened as much, and sometimes more, by immersing the briquettes in water maintained at the comparatively low temperature of 116 deg. Fahr., as when immersed in a bath at the enormous temperature of 177 deg. Fahr.
- 3.—That no 'fully' limed cements would withstand the 'hot test,' but that all fully, or over-clayed cements would stand it, and that consequently the test acted prejudicially to what is accepted as a good cement, and gave preference to the over-clayed and quick-setting ones.
- 4.—That nearly any cement that had been aged sufficiently would stand the hot test.

As the result of these experiments the author came to the conclusion that the hot test could hardly be considered a satisfactory test, and as the test has not made any great headway with either users or manufacturers, it seems that the conclusion he arrived at was fully justified."

SANITARY CLASSES, YORKSHIRE COLLEGE, LEEDS.—We have received the prospectus of the lectures and classes formed at this college for the teaching of Sanitary Engineering on the most advanced lines. Mr. Spinks, A.M.Inst.C.E., is the lecturer, and courses of lectures are delivered, not only at the college, but at various centres, the lectures being delivered free, and the local expenses only being paid by the locality. The subjects on which instruction is given are classed under Hydraulics and Water Supply, Road making, Town Sewerage Works, and Home Sanitation.

TYRES' PATENT POSTAL TUBE.—This tube, manufactured by the Government Postal Tube Company, has a slit or eyelet near one end sufficiently large to enable the finger and thumb to grasp a drawing or photograph enclosed in the tube, and draw it out without injuring it. Photographs are not infrequently injured in extracting them from the tube of the ordinary pattern, and the improvement is a useful one.

Illustrations.

ROYAL UNITED SERVICE INSTITUTION.

THIS drawing, which was exhibited at the Royal Academy of the present year, represents the front of the new building adjoining the Banqueting Hall on a large scale, and in a more front view than the smaller drawing which we published on May 13.

We gave with that publication a description and plans of the building, of which Messrs. Aston Webb & E. Ingress Bell are the architects.

COURTYARD OF NEW HOUSE AND STUDIO.

THIS is a view of the courtyard formed within the buildings for a house and studio which are being carried out for a well-known sculptor, from the designs and under the superintendence of Mr. Howard Ince. The small plan attached to the drawing shows sufficiently the general arrangement of house and studio, the scheme of which is pretty obvious without the labelling of the rooms. In the original drawing, which we commented on when noticing the drawings in the Architectural Room of the Royal Academy, the lower portion of the wall facing the spectator up to the string-course, is shown of a warm reddish tint, the part above the string being white, thus giving a quiet variation in colour (one can hardly say polychromy, which adds to the individual character of the building. The house gateway placed diagonally, with the colonnettes surmounted by figures, is a very pretty incident, and the general appearance of the building, though quiet and unpretending, conveys the idea of its being the home of an artist.

DESIGN FOR A BOOK-COVER.

THIS design, by Mr. Rowland G. Jones, was exhibited in the Architectural Room at the Royal Academy this year.

It is intended for a cloth binding, gold on dark blue, some of the detail and title being relieved with a dark red ground, the border in grey.

PROPOSED HOUSE, LLANDAFF.

THESE are illustrations of the entrance and garden fronts of a house proposed to be built at Llandaff. The plan was arranged so that a billiard-room and a swimming-bath, with bedrooms over, could be added at a future date to the west side of the house, with entrance from the hall.

The walls up to the first floor level are shown to be faced with red brick, with stone quoins and sills, the first floor walls being hung with tiles and half timber work. The whole of the woodwork would be stained dark brown, and the roofs would be tiled.

The drawings are by the architect, Mr. R. A. Briggs.

AN ALBERT DURER WINDOW, FAIRFORD.

THIS illustration is taken from another of Miss Emma Knight's admirable water-colour drawings of the windows at Fairford Church, the design of which is commonly attributed to Albert Dürer, another of which was published in our pages a year or two since.

The subject of this three-light window belongs to the interval between the death and resurrection of Christ. The taking down from the Cross is shown in the left-hand compartment, in the centre light is "The Entombment," and on the right is Christ preaching to the spirits in prison. Above is a combat between angels and evil spirits. Below Adam and Eve, the first transgressors, are being set free. The most remarkable point in the design is the agonised face of the spirit behind the grating in the rear, one of the "spirits in prison" who are not freed; one of the many instances of the intensity of feeling with which the artist, whether Dürer or an unknown Mediaeval painter, endeavoured to realise his subject.

SHEFFIELD MUNICIPAL BUILDINGS.—The contract for the marble wall lining, &c., to hall and corridors, at the new Municipal-buildings, Sheffield (Mr. E. W. Mofford, architect), has been secured by Messrs. J. & H. Patteson, of Manchester.

THE ARCHITECTURAL ASSOCIATION SUMMER VISITS.

COLCHESTER, LAYER MARNEY, AND COPFORD.

A COMPARATIVELY small number of members went on Saturday last, under the guidance of Mr. Francis Hooper and Mr. Arnold Mitchell, to spend a day in Essex. Colchester was first visited, rich in Roman remains, whether it be the Camalodunum of Roman writers or not. Camalodunum or Colonia, or Colchester, was, as is clearly evident from the many and important remains of Roman art which have been discovered, a settlement of very high importance. Large quantities of Roman tiles are to be seen in several of the old buildings of Colchester, in the Castle and St. Botolph's Priory especially.

The history of Colchester is of considerable interest, from the time when, as the *Cæsar* of the Britons, it was a town of considerable importance before the Roman occupation, and various points of historical interest were noted by the visitors.

An inspection was first made of the ruins of St. Botolph's Priory, with their curious construction of Norman work in rubble stone and Roman brick, while the absence of dressed stone, except at the west doorway, suggested that stucco must have been the material in which the architectural dressings were executed, a supposition supported by the existence of some remains of plastering, evidently of very early date, still to be seen. No authentic records of its erection exist, but appearances seem to indicate that the building was erected between 1120 and 1150.

Next a visit was paid to the Castle, now occupied as a museum, while the grounds are laid out as a public park. The original Roman Castle was largely repaired by Edward the Elder, and is a fine monument of Saxon and Norman work, with some of the finest herring-bone work in existence, and Roman bricks of remarkable size. The castle has stood many a siege, being taken by King John from the garrison of Safer de Quincy, Earl of Winchester, and by King Louis of France, and the barons, time after time. Its last siege was in 1648, when it was gallantly defended by the Earl of Norwich, Lord Capel, Sir Charles Lucas, and Sir George Lisle for eleven weeks against the Parliamentary forces under Fairfax, to whom, however, it was finally surrendered, when the captains Sir Charles Lucas and Sir George de Lisle were shot under the castle walls, as is commemorated by an obelisk on the north side of the park.

In the museum the visitors were shown the famous Colchester vase, with the contained ashes of the gladiator whose most notable exploits are vividly depicted on the exterior. Many other fine specimens of Roman work were also seen, as well as a specimen of the baize, for the production of which Colchester was formerly noted, and which was manufactured there, and in the neighbouring towns and villages of Constable's country. Specimens of this baize are now very rare, although there are still living those who have assisted in the industry introduced by the Flemings in the reign of Elizabeth, but now quite extinct.

A visit was made to the church of St. Peter's, an ancient structure, erected before the Conquest and noticed in Domesday Book as the only church then existing in Colchester, and then, after lunch the party drove to Layer Marney, to see the interesting mansion and church, which have already been described in the *Builder*. Leaving Layer Marney, the party next drove to Copford Church, where they were met by the rector, the reverend Benjamin Ruck-Keene, under whose guidance they inspected the church with its little-known, but very remarkable series of mural paintings of eleventh and thirteenth-century date. These were for many years covered with whitewash, and the modern resuscitation was prompted by the account in Wright's History of Essex, "That about the year 1690 A.D. Copford Church was restored at the charge of the parishoners, and that, upon scraping the walls in order to be whitewashed, there appeared very fair and fresh paintings of 'Christ upon the Cross,' 'St. Peter's mother-in-law lying sick of a fever,' of 'Mary Magdalene,' and other representations, which were all whitened over again but not otherwise injured." In the search for these paintings, the whitewash was, in 1872, scraped off the interior of the apse, and the interesting paintings of this part of the church were discovered, though the subjects mentioned in Wright's History were not then found. The paintings of the apse were recoloured by Mr. Daniel Bell, literally and exactly

The paintings of the apse were clearly of two distinct dates, those on the vault being of that Byzantine character seen in some of the Rhenish Romanesque churches, such as Schwarz Rheindorf, and in much of the early French glass. It is generally supposed that an exodus of artists, monks from Constantinople about the middle of the twelfth century introduced into Western Europe the art of Byzantium, of which the apse of Copford Church is one of the evidences. The paintings of the apse represent in the centre a Majesty, with a vesica surrounding the figure of our Lord, who is represented as holding a book in His left hand, the right, with two fingers raised, giving the benediction. Around the central Majesty are angels, and behind them the remains of many towers, signifying, probably, the New Jerusalem. On the spay of the east window was discovered the figure of an angel treading on a serpent, doubtless St. Michael, and another angel opposite, possibly St. Gabriel.

Around the walls of the apse are the figures of St. Thomas, St. John, St. Peter, St. James, St. Simon, St. Paul, St. Andrew, St. Philip, St. Matthew, and St. Bartholomew, but these are clearly later than the paintings of the vault.

Of the paintings in the nave, one of the most interesting is that on the south wall, at the end nearest the chancel, which appears to represent King Stephen receiving the Eucharist at the hands of angels. Others represent our Lord's flight from Bethlehem, the contest of Samson with the lion, and, in the finest untouched original mural painting in the church, the story of the Centurion's servant, which is doubtless that referred to Wright's History as the healing of St. Peter's mother-in-law. These do not exhaust the list of paintings in one of the most remarkable series of early wall decoration extant in England.

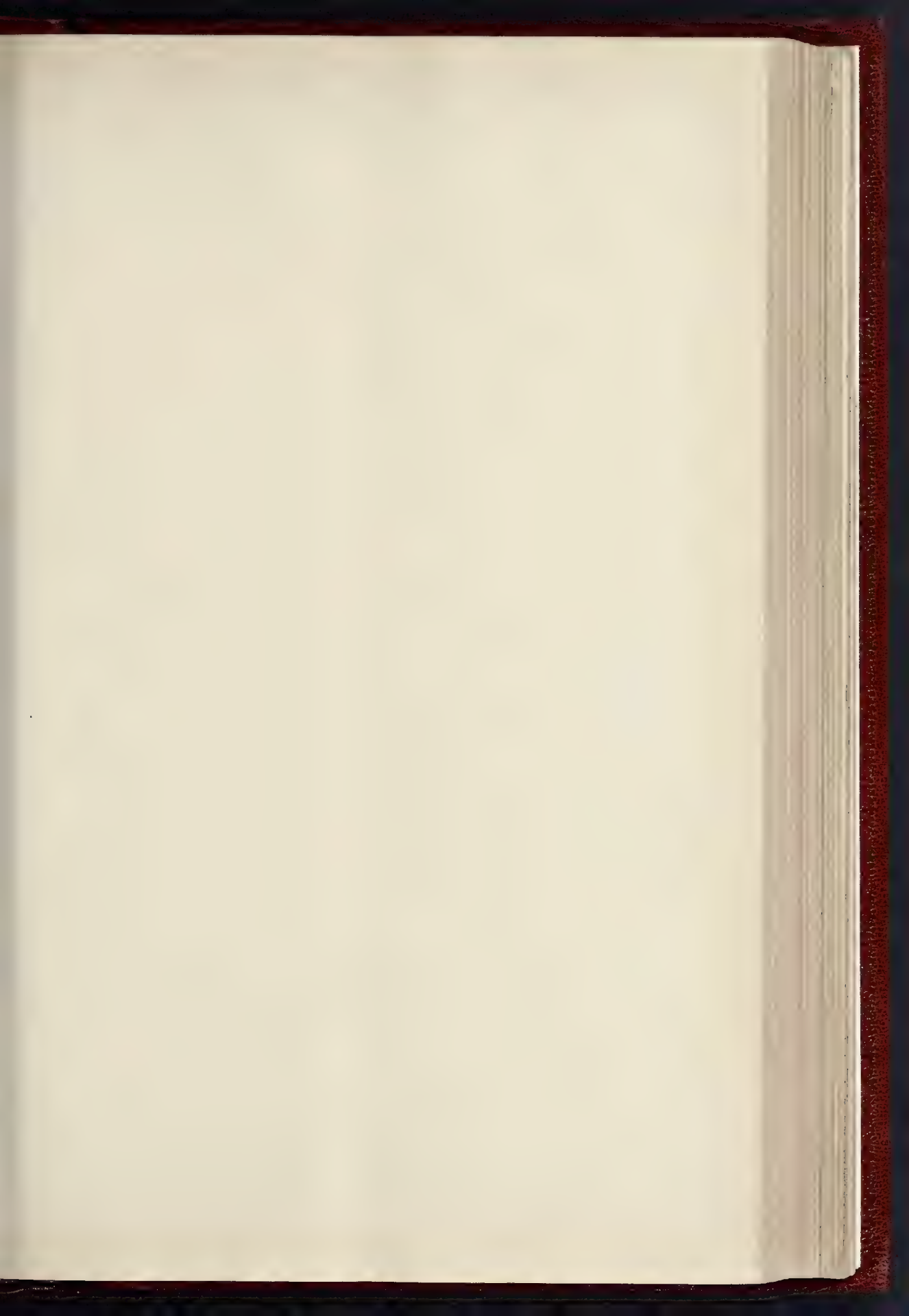
The church, apart from its decoration, is far from lacking interest. The structure itself, of flint, stone, and Roman tile, is a remarkable piece of Norman construction, while the clear evidence of the existence of a residence over the original vaulting of the nave is very remarkable. The chancel screen is an admirable example of the work of the end of the fourteenth or beginning of the fifteenth century, but has suffered somewhat from the coarse and incongruous additions of cornices and buttresses, added when the church was restored. One of the nave arches, inserted probably when the aisle was erected in the fourteenth century, is a fine example of early Essex brickwork, with its small bricks and very wide mortar joints forming a very pleasing piece of constructive and decorative design. The door now placed to the north entrance of the church is of very ancient date, with good ironwork, and was originally covered with skin, which is said to be that of a Dane, and is, from microscopical examination, pronounced to be either that of a pig or of a human being.

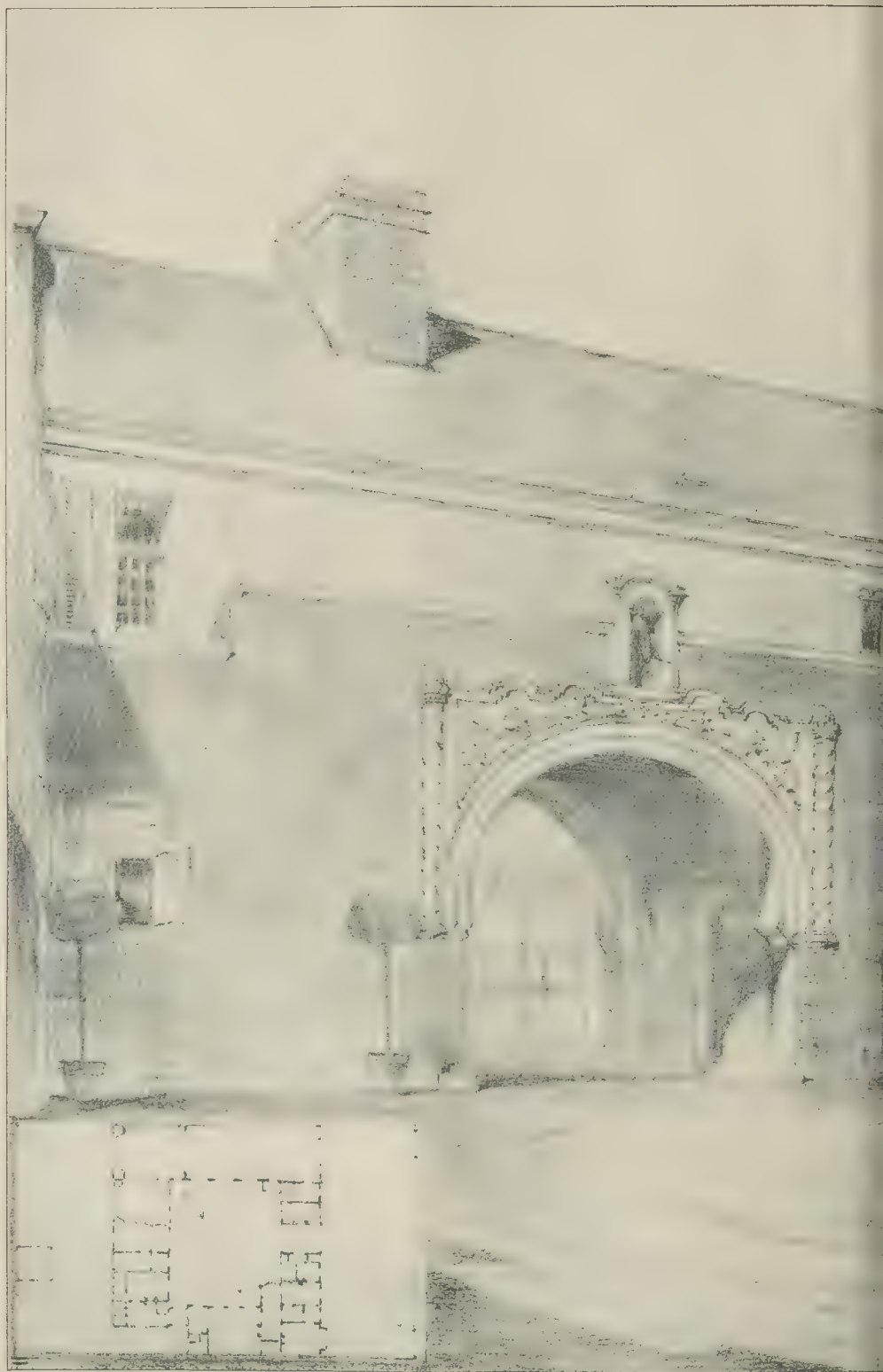
The visit to the highly interesting church of Copford completed the work of a remarkably enjoyable day, and the party then returned to town from Marks Tey Station, which, for the benefit of those who desire to see Copford, we may mention is the nearest point to that church.

LAUNDRY EXHIBITION.

AN exhibition of laundry machinery and accessories required for washing was opened on Monday at the Agricultural Hall, Islington. Like several recent exhibitions at the Agricultural Hall, the present one was far from complete on the day of opening, but so far as an opinion could be formed under these circumstances, the exhibition is a very representative and interesting one. A large number of machines for washing, ironing, &c., clothes, and for ventilating laundries and other buildings are exhibited, and altogether about 200 firms are represented.

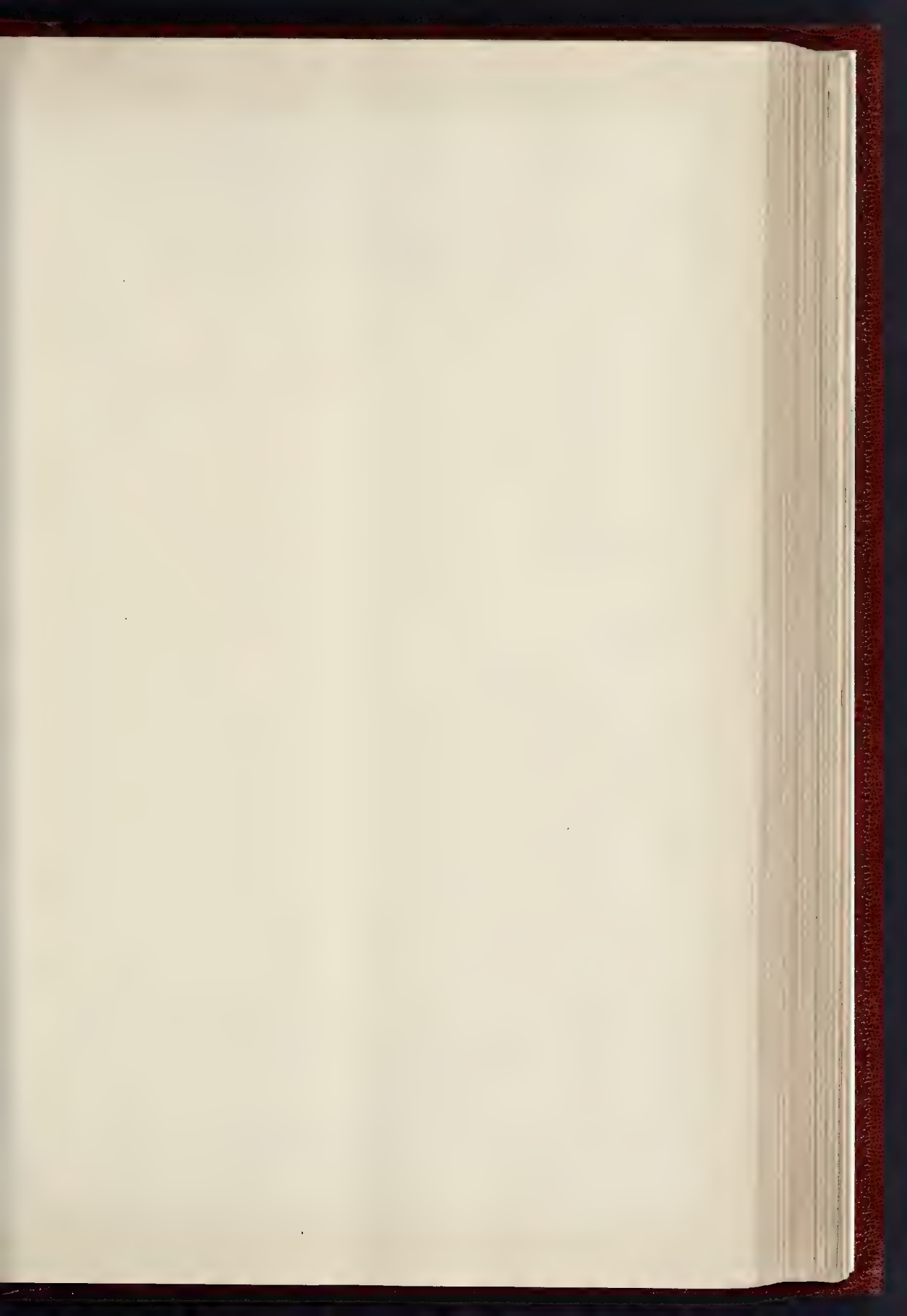
Amongst the exhibits of special interest to our readers is a large apparatus, exhibited by Messrs. Doulton & Co., of Lambeth, for softening water, which is capable of softening 500 gals. of water per hour. The apparatus exhibited is used chiefly for laundry purposes, but it is adaptable for manufacturing and household purposes generally. It has for its object the prevention of incrustation in boilers, and the obviation of temporary and permanent hardness in water. Water is conveyed to a tank at the top of the apparatus and a softening re-agent, lime, is mixed with it. It then flows into a second tank where it is mixed with the water to be softened, in the proportion of one of the re-agent to six of the water to be softened. Precipitation then commences and goes on over and under a series of "baffle plates," which retard the process until the necessary chemical action has taken place and the water





COURTYARD OF NEW HOUSE

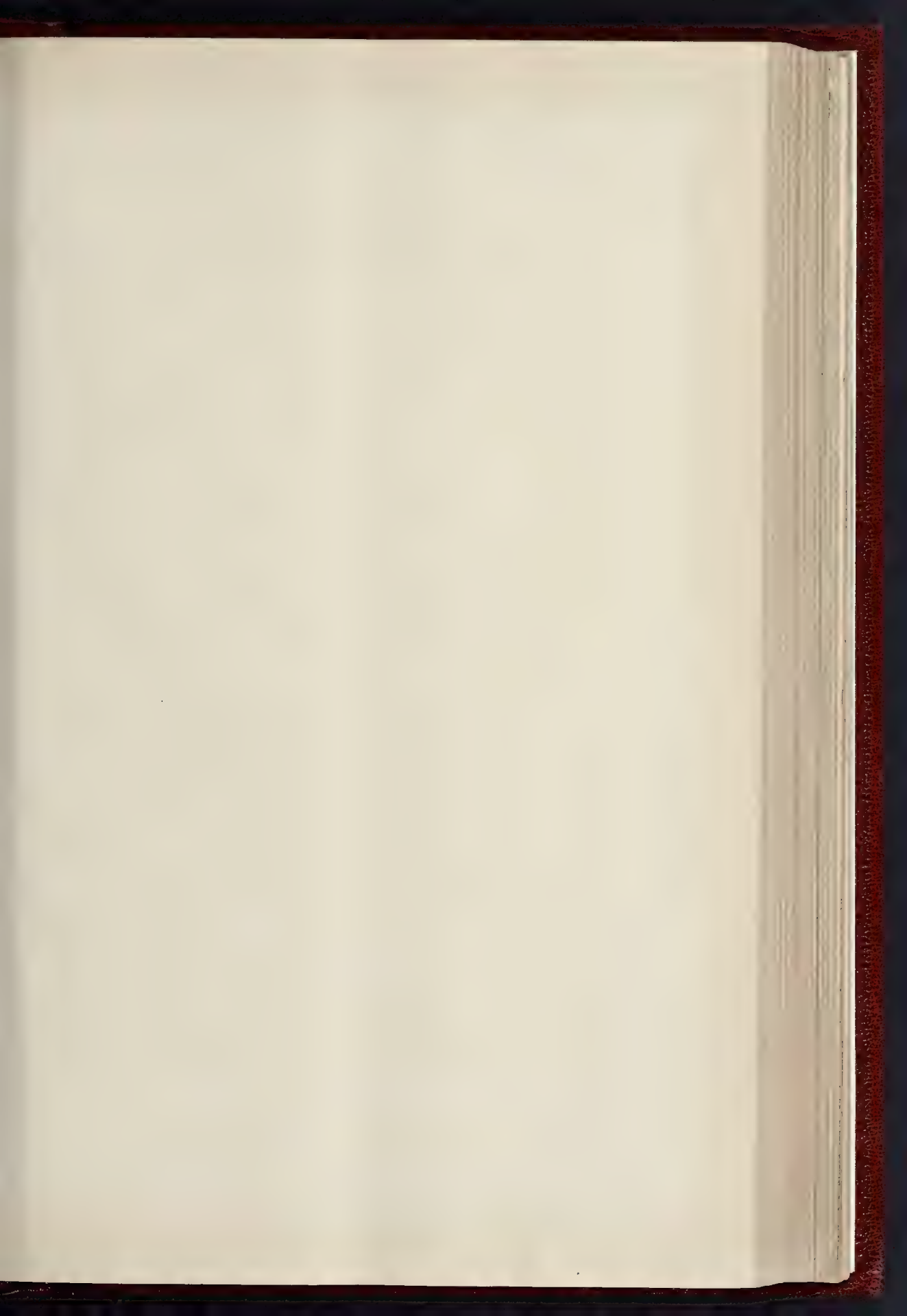




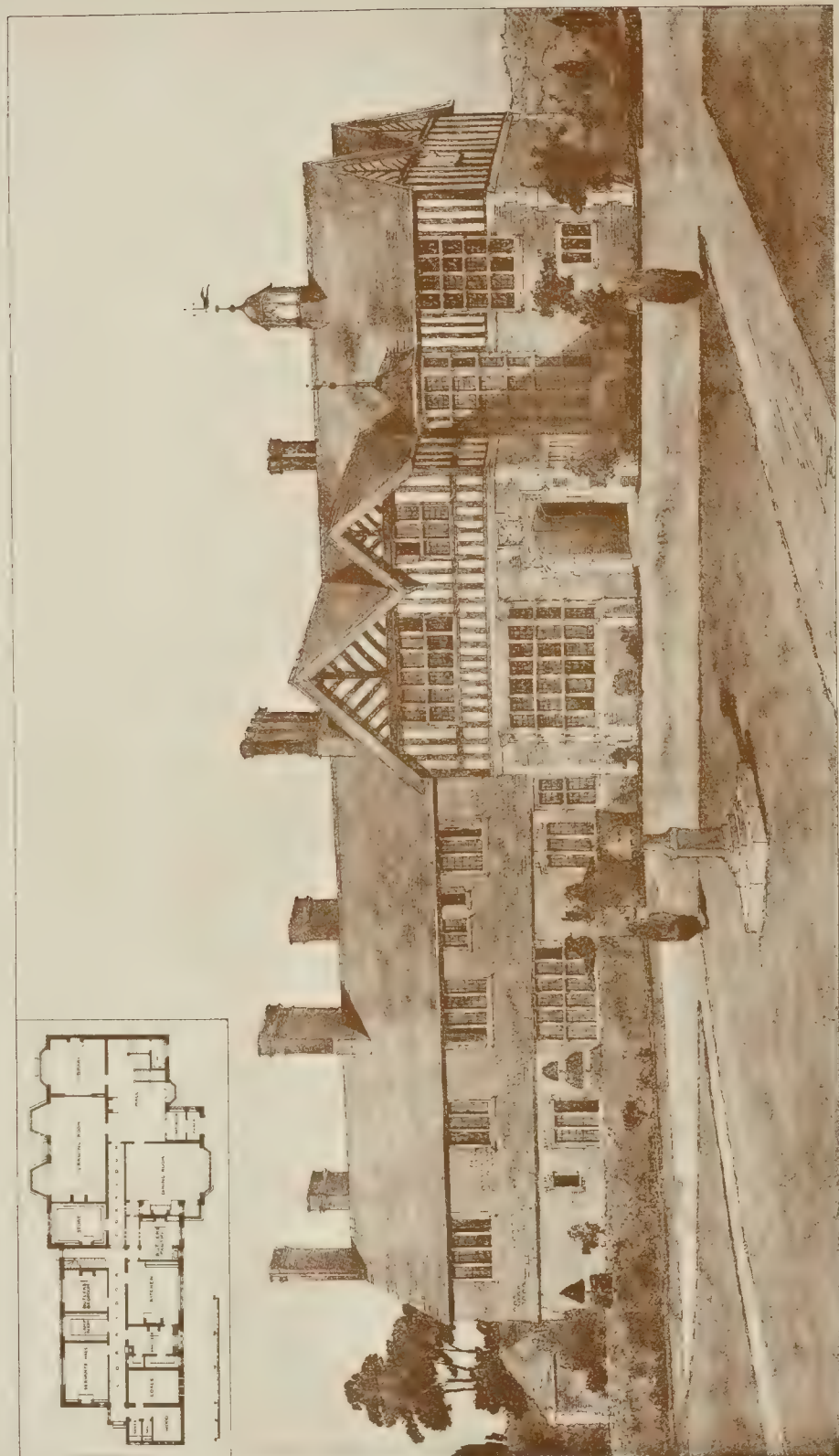
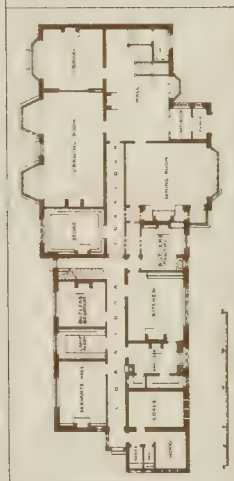


DESIGN FOR A BOOK COVER BY MR ROWLAND G. JONES

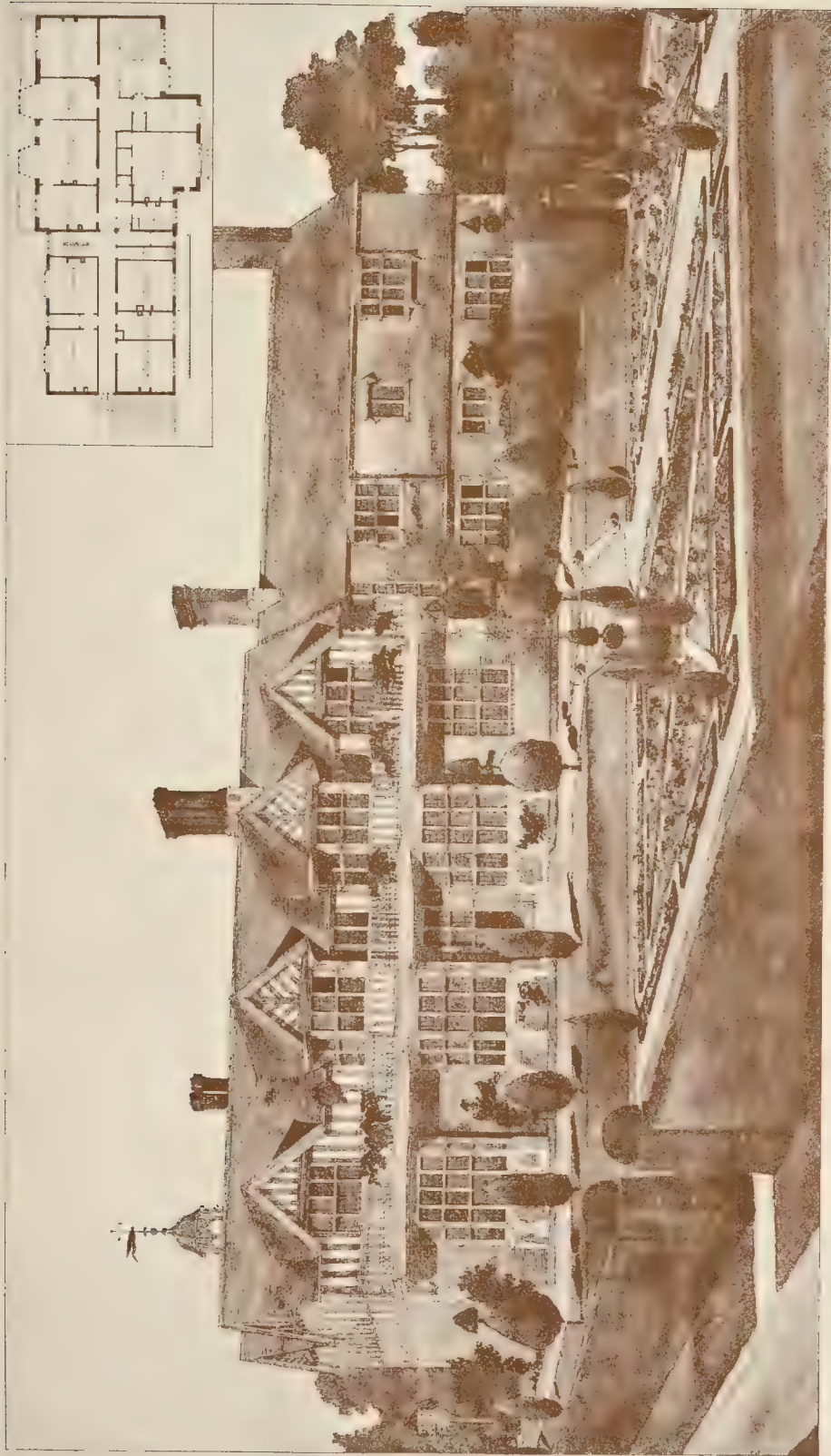
Royal Academy Exhibition, 1893



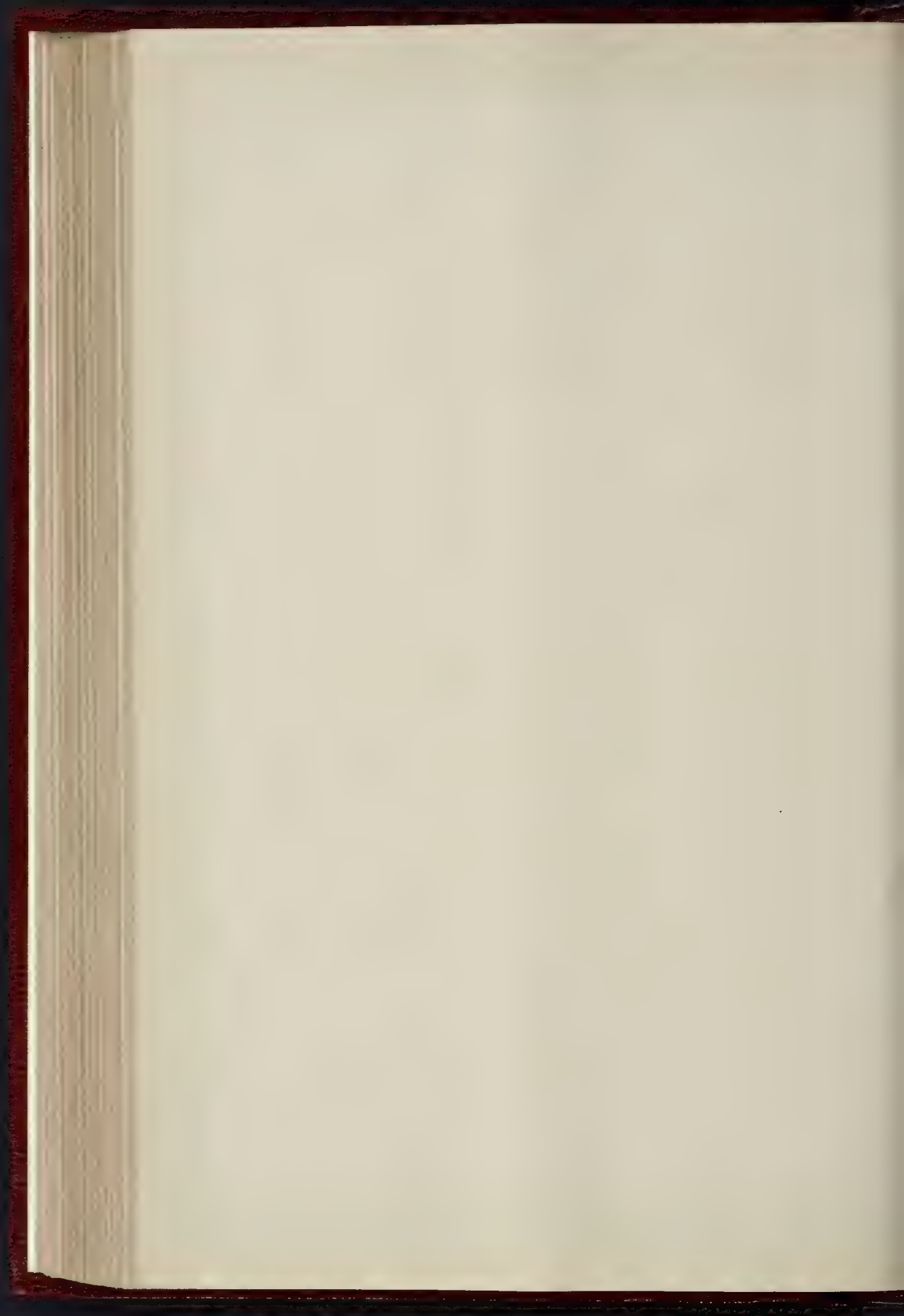
THE BUILDER, SEPTEMBER 16, 1893



DESIGN FOR A HOUSE AT LLANDAFF. ENTRANCE FRONT.—MR. R. A. BRIGGS, F.R.I.B.A., ARCHITECT.

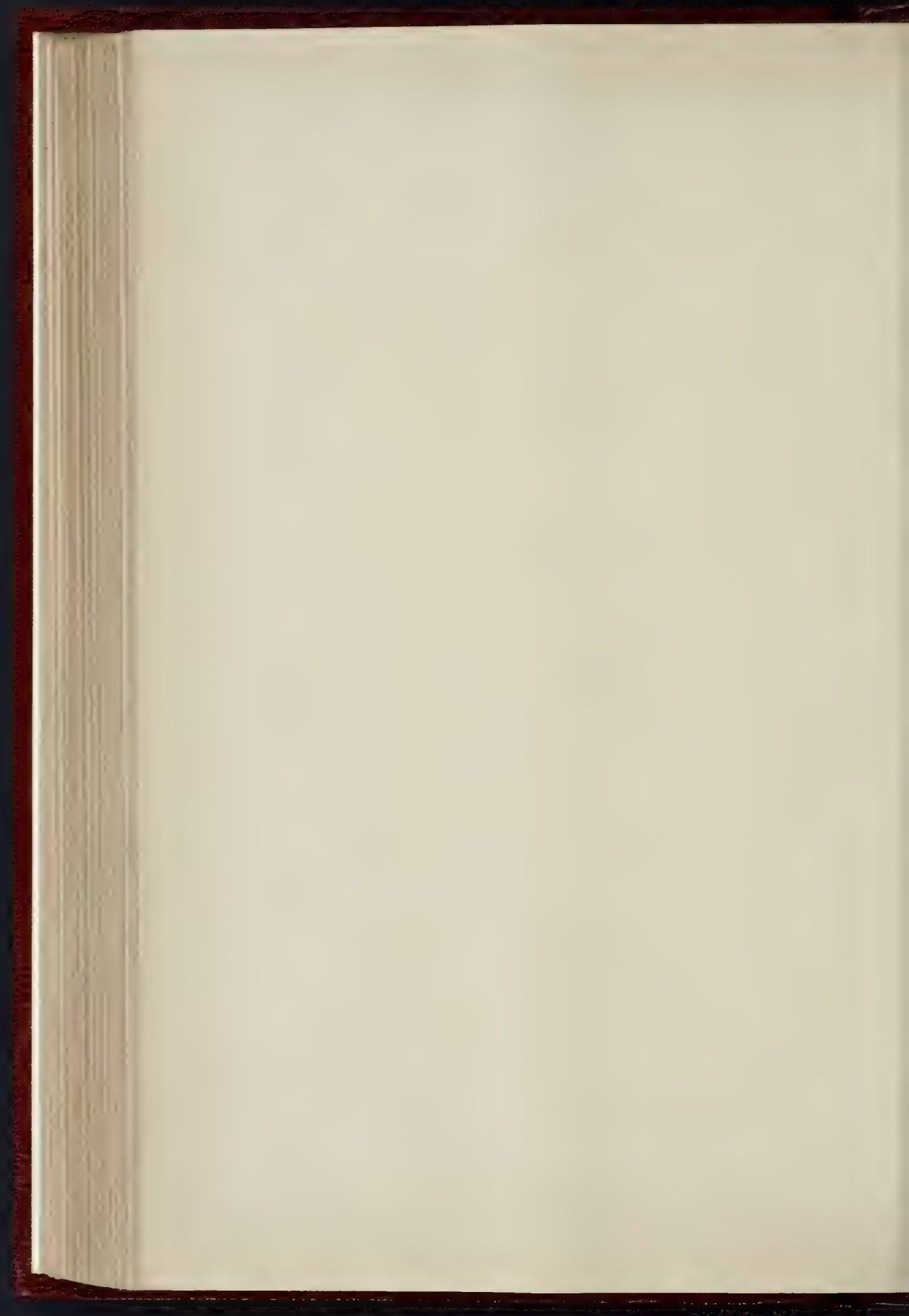


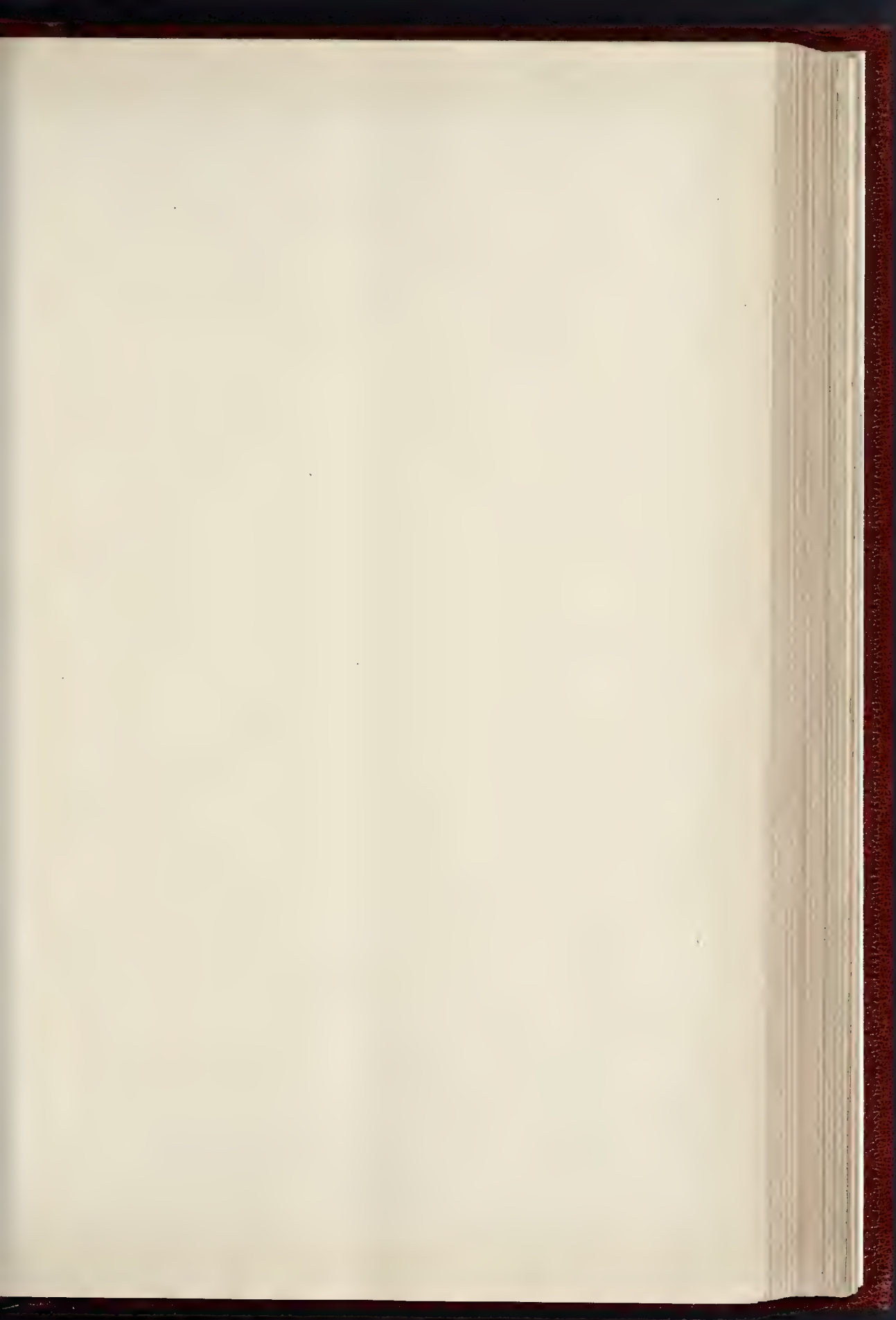
DESIGN FOR A HOUSE AT LLANDAFF. GARDEN FRONT.—MR. R. A. BRIGGS, F.R.I.B.A., ARCHITECT.



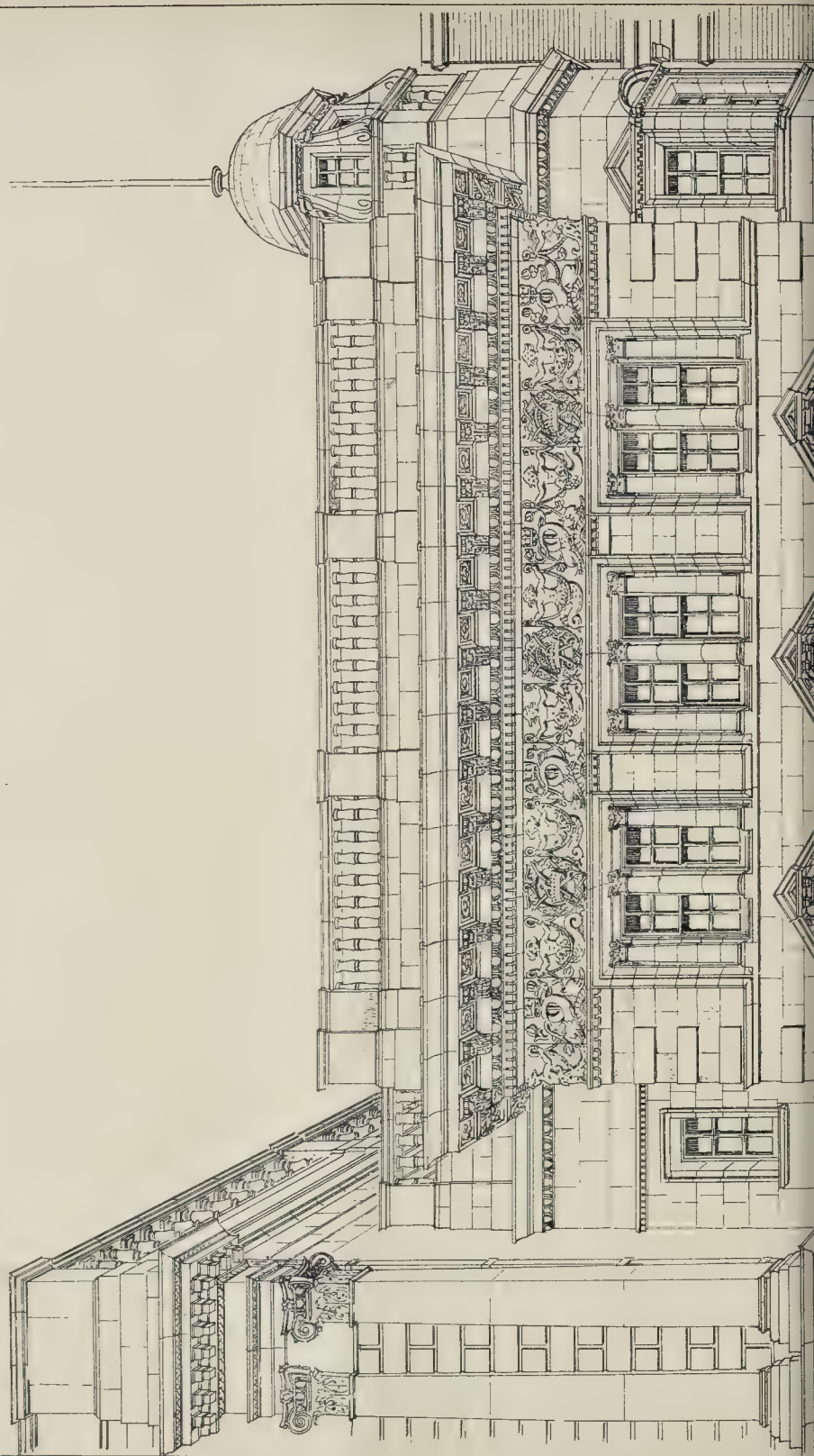


AN "ALBERT DURER" WINDOW, FAIRFORD CHURCH, GLOUCESTERSHIRE.—FROM A DRAWING BY MISS EMMA KNIGHT.
Art Academy Exhibition, 1893





THE BUILDER. SEPTEMBER 16, 1893



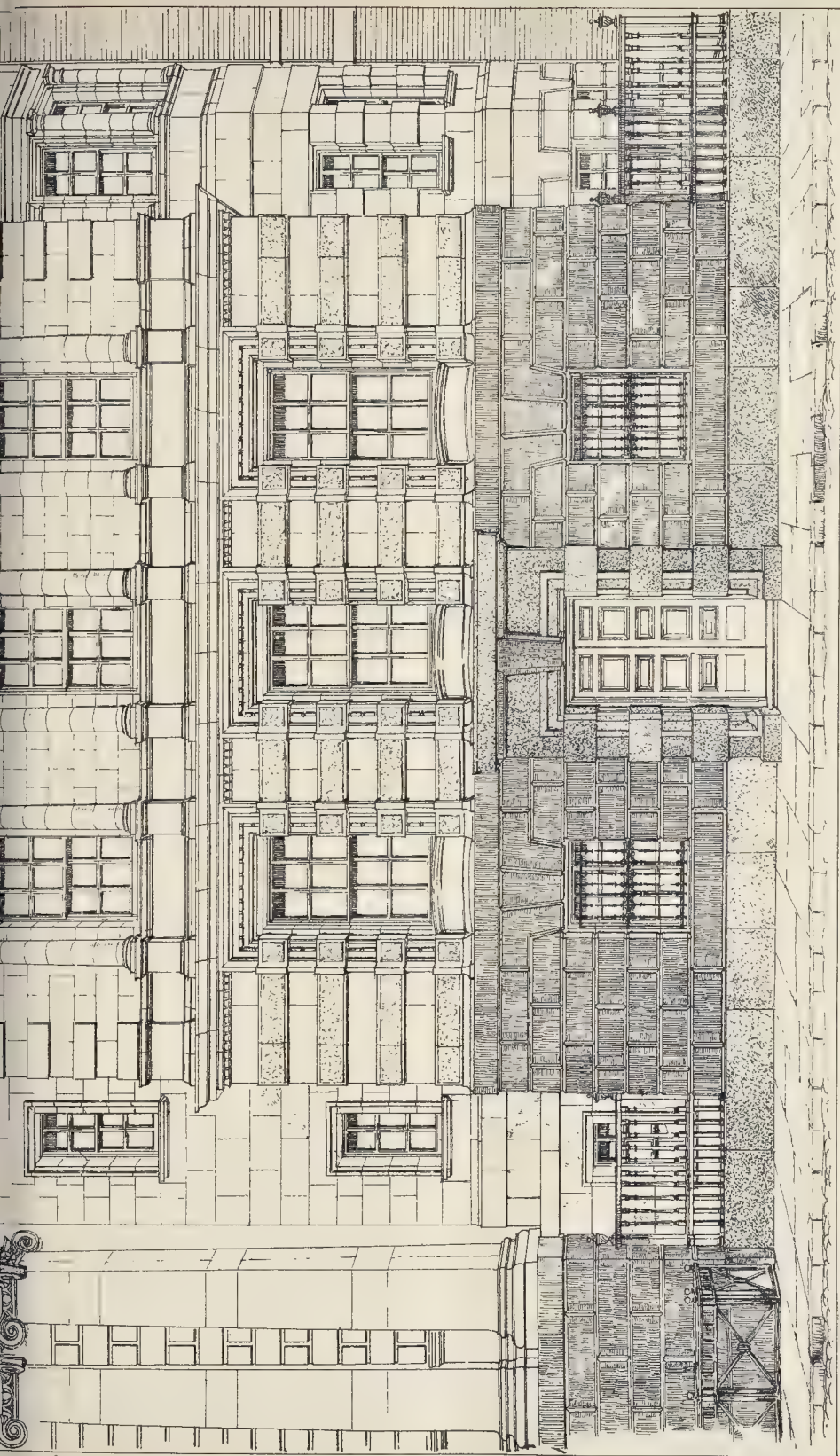


PHOTO. LIND. SPRINGER & CO. 44-45 EAST HADSON STREET, JEFFERSON LAUREL, N.C.

NEW BUILDING FOR THE ROYAL UNITED SERVICE INSTITUTION, ADJOINING THE BANQUETING HALL, WHITEHALL
 MESSRS. ASTON WEBB & E. INGRESS BELL, ARCHITECTS

Royal Academy Exhibition, 1893

has been made soft. The process is completed by passing the water through a filter. It is claimed for the apparatus that it requires but little attention, and is therefore almost automatic in action.

The Blackman Ventilating Company, Limited, in addition to their patent air propeller, exhibit a model drying closet, which is suitable for drying timber, leather, &c., as well as clothes. A continuous current of hot dry air is employed, which may be alternately used to dry clothes or timber in one apartment while work is being carried on in another.

Messrs. Baird, Thompson & Co., of Queen Victoria-street, exhibit a large assortment of their ventilating appliances, and they show their patent air propeller, which, judging from the model exhibited and in working order, is a very effective fan. The same firm also show an improved compressed air engine combined with the "Grathtryx" air nozzle, the object of which is to provide for the proper distribution of air in any large building. The compressed air is conveyed by a small pipe into a flue or funnel, where it is allowed to escape through an air nozzle, inducing movement in the adjacent air. The system is applicable both for withdrawing foul air and admitting fresh air, inasmuch as the nozzles can be reversed.

Messrs. Aland & Co., of Commercial-road, and Messrs. J. H. Pickup & Co., of Queen Victoria-street, exhibit their air propellers; and Messrs. A. W. Kershaw & Co., of Lancaster, show various forms of their pneumatic ventilators and their inlet and air diffusers.

Messrs. Sam. Deards & Co., of Eldon-street, E.C., show a model roof, glazed without putty, paint, or glue, and the "Little Samson" hot-water heating apparatus.

Messrs. Thwaites Bros., of Bradford, exhibit a water-solifting apparatus (Andrew Howatson's patent); and amongst several other useful exhibits we may mention one by Messrs. Isaac Brathwaite & Son, of Kendal and London, which consists of an elastic steel door-mat, made of flat steel strips.

We may add that a model laundry, in full working order, is shown, and also that the exhibition, which closes on the 23rd inst., is to be an annual affair.

THE TRADES UNION CONGRESS.

WE continue our notes of the proceedings of the Trades Union Congress, which terminated on Saturday last.

Employers' Liability Bill.

On Wednesday in last week Mr. E. Harford moved the following resolution:—

"That this Congress heartily approves of the Employers' Liability Bill now before Parliament, containing as it does the principal points for which it has contended for years, and amongst the most important of these being the provision against contracting out of the Act, without which no measure will be acceptable to the organised workers of the kingdom."

Mr. Andrew Clark (Railway Workers) seconded the motion.

Mr. Henry Broadhurst congratulated the Labour Members on the fact that the Bill for which they had contended since 1876 was now so near being passed into law. He hoped that the Parliamentary Committee would not permit any contracting out of the Bill whatever.

Mr. Pickard (London) referred to the builders' labourers as a class to whom the Bill would be most valuable.

Mr. John Burns, M.P., said there was one point—the liability of the sub-contractor, which was omitted from the Bill, but if this were dealt with they would have about as good a Bill as could possibly be.

Mr. Freck (London) moved:—

"That the Parliamentary Committee be instructed to use their influence to get a clause in the Employers' Liability Bill to the effect that where the plaintiff has to carry on an action for damages against a defendant and the case is defended by a third party—an insurance company or agent—the plaintiff to have the right (in the event of his getting a verdict for damages) to sue the company or agent if same be not paid."

Mr. J. E. Collins (London) seconded the resolution, which was rejected by a large majority.

The Chairman then put the resolution upon Employers' Liability, as moved by Mr. Harford and amended by the Congress, and it was carried almost unanimously.

The Eight Hours Question.

On Thursday a long debate took place on this question.

Mr. Ben Tillett moved the following resolution:—

"That the Parliamentary Committee promote a Bill regulating the hours of labour to eight per day, or forty-

eight per week, in all trades and occupations, which Bill should contain a clause enabling the organised members of any trade or occupation, protesting by ballot against the same, to exempt such trade or occupation from its provisions."

He said that the resolution established the principal of scientifically adjusting the efficient energy of the worker to the need of the trade. It abolished overtime which, whenever practised, tended to lower wages for the day's work proper. It conducted to more regular employment, and tended to ensure for a greater number steady employment. It increased the pay for the average day's work. It ensured to the worker the contemporaneous and co-equal advantages of improvement in industrial methods, whether by the introduction of more effectual trading or increased industrial facilities. It determined a period of each day for recreation, offering opportunity for education and participation in democratic government. It ensured better health for the community, as the physical tension necessitated by long hours ended with the physical deterioration of the race. It was the best insurance against strikes. The standard of efficiency was greatest in those communities whose average day's labour was restricted to short hours, and the highest standard of wages and living conditions existed in those countries where the fewest hours constituted a day's labour.

Mr. Keir Hardie, M.P., seconded, and the motion was carried by 97 votes to 18.

Engineers' Qualifications.

Mr. John Anderson moved:—

"That this Congress again requests the Parliamentary Committee to take the necessary steps with a view to having a Bill reintroduced into Parliament making it compulsory whereby those in charge of engines and boilers must have the necessary qualifications for this most important class of industry, by it being made compulsory that certificates of competency should be produced, not only in the interests and safety of the public, but also of our public servants themselves, more especially at her Majesty's dockyards, where attempts have recently been made by the Admiralty to reduce the staff of qualified men and in many instances replaced engineers and engine-room artificers by others ignorant of such duties. The same practice has been resorted to in the mercantile marine, so that we not only run the risk of crippling our naval service, but also endangering the safety of the public at large. Also that the Parliamentary Committee be directed to request the Board of Trade to discontinue the employment of marine engineers on repairs to the vessel on which they are engaged, and on which spare engineers might find employment whilst in any port in the United Kingdom."

Mr. F. Crompton seconded the motion.

Mr. F. Thurston moved as an amendment, to delete all the words after "industry."

Mr. W. Muir seconded.

The amendment having been rejected, the resolution was ultimately adopted.

Mr. P. J. King next moved the following resolution:—

"That the Parliamentary Committee be instructed to insert a provision in the Bill introduced into the House of Commons enabling men attending boilers and chemical and copper works to obtain certificates of competency after giving evidence that they have worked in that capacity for a period of six months at any time previous to the passing of the Act."

Mr. McHugh seconded, and the resolution was agreed to.

Contractors and Sub-contractors.

Mr. McKeown moved the following resolution:—

"That the Parliamentary Committee be instructed to urge upon the Government the necessity of abolishing all contractors and sub-contractors in their workshops, and that the labour be employed direct, and not through middlemen."

Mr. John Burns seconded, and the resolution was carried without a division.

Wages and Government Contracts.

On Friday the Congress continued its sitting. Mr. Collins moved the following resolution, which took the place of six resolutions:—

"That, in the opinion of this Congress, the expression 'fair wages' in the House of Commons resolution of February 13, 1891, re Government contracts, should be interpreted and construed to mean the usual trade union rate paid, and conditions of employment in force in each trade in the locality in which any Government contract is executed for the time being. This Congress calls upon the Government to insist on such conditions being inserted in all their contracts that will compel contractors to pay trade union rates of wages, observe trade union conditions, discontinue the employment of juveniles to supply competent adults, and to purchase all manufactured goods necessary for the carrying out of their contracts from only such firms that observe the same conditions. And, furthermore, that all contracts should be subject to a free and open competition; also the present rate of wages paid in Government workshops to labourers is insufficient and contrary to the principle of a resolution passed in Committee on fair wages; and this representative body of workmen urges the Government to at once put into force that resolution, and pay the same rate as is given by private firms, and to urge the necessity of abolishing all contractors and sub-contractors in their workshops, and that the labour be em-

ployed direct and not through middlemen, and, further, to discontinue the sale of any disused Government stores in such a condition that they can again be placed on the market to the detriment of the industrial classes. That the Parliamentary Committee be instructed to bring the foregoing under the notice of the Government."

Mr. Simmons seconded the resolution, which was agreed to.

Contract Labour.

On the proposition of Mr. Cronin, seconded by Mr. Vickers, it was resolved:—

"That the Parliamentary Committee proceed as quickly as possible to introduce a Bill into the House of Commons on the lines of the American Contract Labour Law, to make it illegal and punishable by imprisonment to contract with and import workmen from outside the United Kingdom to work in the United Kingdom during labour disputes, trade depressions, or while there is an unemployed class existing."

The Housing Question.

On Saturday the only other matter of special interest to our readers which came up for consideration was the following resolution, which was submitted by Mr. Uttley and agreed to:—

"That this Congress desires to emphasise the vital importance to all workers of securing wherever possible the adoption of the various Artisans' Dwellings Act by their respective local sanitary authorities, and strongly urges upon all trade unionists and reformers to make it one of their imperative questions in selecting or supporting candidates for such bodies. Furthermore, in the opinion of this Congress it should be compulsory on the part of all sanitary authorities that they shall supply wherever the need exists healthy artisans' dwellings at the lowest possible rents."

COMPETITIONS.

RESTORATION OF THE OLD PARISH CHURCH, ARBROATH.—The Committee of the Arbroath Town Council appointed with reference to the restoration of the Old Church met recently to consider the report by Mr. Hippolyte Blanc, A.R.S.A. Edinburgh, on the designs submitted for the restoration of the church by the following architects:—Messrs. Hay & Henderson, Edinburgh; John Starforth, Edinburgh; David Robertson, Edinburgh; John James Burnett, Glasgow; David McMillan, Aberdeen; Carr & Symon, Arbroath; and Hugh Gavin, Arbroath. Mr. Blanc placed the designs by Mr. Burnett first; Messrs. Hay & Henderson, Edinburgh, second; Mr. David Robertson, Edinburgh, third; and Mr. Hugh Gavin, Arbroath, fourth. There are three premiums, two of 20*l.* and one of 10*l.* Ex-Bailie Cargill moved that the Committee approve of and adopt Mr. Blanc's report, and agree to lay it before the Town Council, with the recommendation that the design submitted by Mr. J. J. Burnett, architect, Glasgow, be accepted provisionally, and subject to its being found that the plan can be carried out at the specified cost; that it be remitted to the Committee to procure working plans and specifications, and to take in estimates for the execution of the work; and that in the meantime the award of premiums should be reserved. The motion was seconded by Provost Keith, and agreed to.—On the 4th inst. the Town Council had under consideration the report of the Committee, and after discussion it was, by 9 to 7, resolved to disapprove of the report, and to remit the whole matter for consideration by the Council in committee.

ARCHITECTURAL SOCIETIES.

DUNDEE INSTITUTE OF ARCHITECTURE, SCIENCE, AND ART.—The members of the Dundee Institute of Architecture, Science, and Art had an excursion on the 9th inst. to Kinfauns, Perth, &c. By permission of Mr. E. A. Stuart Gray, Kinfauns Castle was thrown open for inspection, and Mrs. Stuart Gray pointed out the objects of interest in the corridor, drawing-rooms, dining-room, library, and museum. Later the gardens were visited. A collection of pictures was viewed with much interest, and also a stained glass window of German origin, as well as the architectural designs within the castle and without. In Perth, St. John's (East) Church, which has been recently restored, was viewed with interest. Mr. G. P. K. Young gave a description of the historical and architectural points of interest in the building. Mr. Wyllie, the organist of the church, described the new electric Hope-Jones system on which the organ is now worked. Luncheon was served at the Royal George Hotel, and from there the party drove to Dupplin Castle by way of Cherybank. By permission of the Earl of Kinnoull, Dupplin Castle was also open for inspection. Here, too, the hall, in which there is part of a valuable collection of china, was viewed. The drawing-room, dining-room, and

library were also visited, and a considerable time was spent in the extensive grounds. From Dupplin Castle the drive was by way of the picturesque ruin of Huntingtower, back to Perth General Station, whence Dundee was reached by train.

GLASGOW ARCHITECTURAL ASSOCIATION. The usual monthly meeting of this Association was held in the rooms, 114, West Campbell-street, on the 5th inst. Three papers on "Architects of the Early Renaissance" were read by Messrs. John Arthur, William Blane, and Charles Davidson, who respectively discussed Brunelleschi of Italy, Philibert de Lorme of France, and Inigo Jones of England. It was noted that the Renaissance took place in Italy much earlier than in any other country, chiefly owing to the abundance of old Classic remains, and to the fact that the Gothic style had never taken so firm a hold on the Italians as on the more northern countries of Europe, where the new style developed slowly, passing through a period of transition. The principal buildings of each architect were described and illustrated at length, and an account was given of their characteristics and the influence they exerted by their works and writings. A short discussion took place, and at the close a hearty vote of thanks was awarded the essayists.

Books.

Essays on Rural Hygiene.—By GEORGE VIVIAN POORE, M.D., F.R.C.P. London: Longmans, Greene & Co., 1893.

THE author's name is in itself a guarantee that this book contains a great deal of valuable suggestion on the subject of which it treats. The title "Rural Hygiene" has been chosen, Dr. Poore tells us, "because it is only in places having a rural or semi-rural character that it is possible to be guided by scientific principles in our measures for the preservation of health and the prevention of disease." The book aims at leading us back, in fact, to first principles. Unfortunately this effort seems to lead the author to some rather Utopian positions. He wants in fact to put a stop to large towns altogether, and asks with seeming naïveté why people should wish to crowd into them. We fear it is a good deal too late in the day for that, although we have long been of opinion that the enormous concentration into London must before long bring about a reaction as far as the capital is concerned. But we think Dr. Poore is unfair and needlessly pessimistic when he affirms that "if a so-called sanitary measure seems likely to increase the rateable value of a district for the time being, that is generally regarded as sufficient ground for bringing it into action." We are of opinion that most of the sanitary legislation which has been carried out in towns of late years has been initiated with an honest desire to improve the hygienic condition of the districts concerned; and surely the fact that it does increase the rateable value of property may be taken as an indication that it is recognised as effecting such improvement.

Dr. Poore makes a dead set at the water-carriage system of removing fecal matter, in other words, at the water-closet, and contends that it has been the source of much disease, of poisoning our rivers, &c., and that it is absolutely unnecessary; that wherever there is a small garden (in which an earth-closet can be placed) all the elaboration connected with water-closets and drainage is unnecessary. The difficulty of the problem of dealing with the enormous aggregate of sewage created by the water system we should be the last to understate, but Dr. Poore seems to ignore other difficulties which cannot be overlooked. It must be admitted that an earth-closet is a thing we cannot have within a house, and he evidently considers that all such offices should be outside of and unconnected with the dwelling house. There is a great deal to be said for that provided we were all people in rude health; but it is surprising to us that a medical man should absolutely overlook the hardship and even serious danger to sickly and infirm people which must arise from their being compelled to go out into the open air to an earth-closet in any weather, however inclement, perhaps even at night. It appears to us that such a system is an absolutely impracticable one for general use on a large scale and in cities, and as far as we remember it has proved a failure and been abandoned wherever it has been tried as a general system. The conditions of civilised life necessitate the provision of the closet within the habitation, though we

entirely agree with the author that more special means ought to be taken to isolate it from the rest of the dwelling in the same way in which it is isolated in hospitals, and that almost all houses in the present day are defectively planned in this respect. But to go back to the earth closet in the garden is simply going back a step, and a very serious one, in comfort and civilisation; and Dr. Poore appears, in making his case against the water-closet, to emphasise and exaggerate all its disadvantages and to shut his eyes to all the advantages and discomforts which must attend on the alternative system.

The remarks on the common defects in the planning and construction of hotels should be studied by all concerned, especially in regard to the frequent bad planning of the bedrooms, long rooms with a window at one end, and also the lack of quiet and in some sense of privacy arising from the employment of thin walls and partitions where there should be solid partition walls. The system of building ranges of rooms with intercommunicating doors to allow of their being thrown into suites as may be required is a most barbarous one, and ought not to be allowed. Suites should be planned and built as suites, and separate rooms as permanently separate rooms. Of course also, as a matter of sanitary condition, we quite agree with the author in condemning the great height of the modern class of hotel, in towns especially, which simply means that more persons are congregated in the space than ought to be; and the same applies to the increasingly prevalent system of lofty blocks of "flats" and of "model" workmen's dwellings, in which people are merely overcrowded vertically in place of being overcrowded horizontally; in fact the objection is much stronger in these cases than in that of hotels, as people live in them all the year round, while, in general, the same people only spend a few days in the overcrowded hotel.

We are glad to find Dr. Poore urging that one of the reforms most urgently needed is the supply of water by meter. We have no doubt that this is bound to come before long, for it is impossible that public opinion can long tolerate the present inequitable system of water-rating and the concomitant petty tyranny and abuse of their powers by water companies.

In treating of the important question of burial, Dr. Poore is strongly opposed to cremation and in favour of earth burial; and, as with the case of water-closets *versus* earth closets, it appears to us that he overlooks all the advantages of the method he condemns and all the drawbacks of the method he recommends. But he is to be thanked for drawing attention in strong terms to one drawback which must be inseparable from cremation if carried out on a large scale and as a generally adopted and recognised system, viz., the inevitable fouling of the air from the enormous amount of the products of combustion which must in that case be discharged into it. It is really amazing to us that the medical men and sanitarians who are recommending cremation as the one system should entirely ignore this probably very serious drawback attendant upon it.

Dr. Poore's book is the statement of sanitary faith of an able man with strong convictions; often, as it appears to us, one-sided and partial in his views, but always with something striking and forcible to say in support of them; and every one interested in sanitary subjects should read it.

A Treatise on Public Health and its Applications in different European Countries. By ALBERT PALMBERG. Translated from the French Edition and the section on England edited by ARTHUR NEWSHOLM, M.D. London: Swan Sonnenschein & Co.; New York: Macmillan & Co. 1893.

THIS is a work of some interest as giving a kind of comparative view of the state of sanitation in the principal European countries, commencing with England, to which a larger space is devoted than to any other country, the author, who is a Swede, recognising that England is ahead of all other European countries in sanitary appliances and sanitary legislation. There is nothing for anyone to learn from the English section; naturally we know more about our own doings in the way of sanitation than a foreigner can tell us, but it is satisfactory to find this country is given so good a record, and our sanitary appliances so fairly illustrated, within a limited space, in a book which has been circulated, as we are informed, in several languages.

From England we go to Belgium, where we learn that the sanitary legislation is in a very defective and antiquated condition, and greatly needs codification, there being no general Public

Health Act for the kingdom. The Belgians are also much behind the English in their appreciation of the value of pure air, they have great fear of draughts in their houses, and "arrange" meets for admitting fresh air into a room are generally wanting. Chinks of windows and doors are closed to prevent catching cold." In recent school buildings, however, a central heating apparatus with an arrangement for introducing fresh air has come into use, but "is only available in winter." The Belgian water-closets are constructed on English models; not however the best or most advanced. In France there is a very complicated system of hygienic legislation, and it is rather in practical details than in general principles that we find deficiency. Some of the special French forms of traps and waterclosets of which a good many are given, are indeed astounding enough to the mind of the English sanitarian. In the chapter on Germany we notice the illustration of the Leipzig system of closets with movable receptacles, which is reported as having proved unsatisfactory and a nuisance, and is being gradually abandoned in favour of water-closets.

Of the details of sanitation in Austria we do not learn very much from Herr Palmberg's pages; but the legislation in regulations with regard to hygiene seem to be far more satisfactory and systematic than in most European countries. In Sweden the hygienic legislation appears to be very full and satisfactory; the details of sanitary apparatus in that country are not much illustrated. Under the heading of Finland we notice a goose stove known as "Andsten's," and the elaborate and scientifically devised means for warming railway carriages reminds us of one point at least in events in which we are behindhand in England.

Of course so large a subject as international or European sanitation could not really be illustrated in detail except in a much larger work than this single volume of rather over 500 pages; but this book is sufficient to give a fair summary of the comparative state of sanitation in the principal European countries; and as all these matters are it is to be hoped, in a state of progress, the labour of producing a larger work with fuller statistics would have been rather thrown away when we consider that the information must necessarily become to a great extent out of date in ten years or so. The book gives us a rapid general survey of the present state of things in Europe, and that is perhaps all that could be of so much practical use. To study the details of sanitary appliances in various countries the reader must apply to the separate specialist publications of each country, and a list of these is given at the end of the book.

The Sanitary Inspector's Handbook. By ALBERT TAYLOR. London: H. K. Lewis, 1893.

THE author of this small book, which is dedicated to Professor Corfield, holds the position of Chief Sanitary Inspector to the Vestry of St. George's, Hanover-square; and his practical experience no doubt qualifies him to act as adviser to young men in the same profession as to the difficulties and the necessary routine of their duties. A good deal of it, dealing with the general subject of nuisances, is beyond our scope; but among the subjects treated of are house drainage, water-closets, waste-pipes, gullies, drain-testing, &c. There is little on these subjects, of course, that is not to be found in larger specialist treatises; the usefulness of the book consists in combining under one cover a summary of all the departments of a sanitary inspector's duties. It may be chiefly useful, we imagine, to those who are putting themselves in training for a sanitary inspector's position, as giving them a kind of summary of the scope of the duties which they have to train for.

Archæologia Oxoniensis. Supplement to Part II. English Architecture before the Conquest. By J. PARK HARRISON. H. Frowde: London and Oxford, 1893.

THIS is a further continuation of Mr. Harrison's interesting notes on Saxon architecture, with the view of establishing a closer connection between it and Roman architecture than has been hitherto supposed for it by some critics, or so Mr. Harrison seems to imply. We do not ourselves understand that anyone with eyes in his head could question the classic relationship of many of the rude efforts at profiting in Saxon capitals, or of some of the ornament and carving of pre-Norman date; but if there are such, Mr. Harrison brings facts forward which should tend to convert them.

Griffin's Electrical Price Book. Edited by H. J. DOWSING, M.I.E.E., &c. London: Charles Griffin & Co. 1893.

MR. DOWSING has well performed a difficult task, and supplied, to use the stock expression, a long-felt want. Price lists of all electrical plant and accessories are given, and every pains seems to have been taken to secure accuracy. The book will be found useful, not only to the trade, but to anyone who contemplates an electric installation, not of course as a substitute for, but as a means of checking, the estimates received. Though the bulk of the volume is taken up by price lists, there are a few practical hints to be found here and there and occasional brief descriptions of processes and apparatus. The Phoenix Fire Office rules and Board of Trade Regulations are also included, and the volume closes with a few well-selected tables.

In a book of this kind the greatest difficulty must be in deciding what to omit. For our part we could best spare the specimen reports on the electrical supply of towns. Indeed we can hardly imagine why they were inserted, unless to give us an opportunity of comparing the respective styles of Mr. Crompton and Mr. Preece, or to create an impression in favour of the low-tension system.

Spon's Tables and Memoranda for Engineers. By J. T. HURST. London: E. F. & N. Spon. 1893.

THE appearance of the twelfth edition is sufficient in itself to prove the usefulness of this little book, which contains a large amount of information and formulae compressed into a volume 2½ in. long and 1½ in. wide, thus being in the true practical sense a "pocket" book.

The Soil in relation to Health. By H. A. MIERS, M.A., F.R.S., F.C.S., and R. CROSSKEY, M.A., D.P.H. London: Macmillan & Co. 1893.

THIS is an excellent little book, containing in a small compass a clear statement as to the influence on health of various dispositions and conditions of the coating of the globe we live on, expressed with scientific clearness and accuracy of definition, but in terms comprehensible to every educated reader. It is a strictly practical little book, well written, but with no wasted words. It is one which architects would find very useful as a brief guide in regard to the questions to be kept in mind and answered when determining the site for a dwelling house, and which may be of considerable use also to rural sanitary authorities in suggesting to them in what direction to look for some of the causes of unexplained disease.

Correspondence.

To the Editor of THE BUILDER.

MECHANICAL AND "AUTOMATIC" VENTILATION.

SIR,—I have lately come across several denunciations of the mechanical system of ventilation with special reference to schools, certain interested persons holding that the automatic system is much superior to it.

It is obvious that mechanical ventilation is comparatively somewhat expensive where the accommodation is small, but in large schools I hold there is no doubt whatever that mechanical ventilation is of great advantage from the points of view both of economy and of health; and I speak from the following experience:—

Along with the late Professor Carnelly, I first moved in the Dundee School Board for the introduction of mechanical ventilation into the new schools. I thus have had reason to watch the system, and after several years' trial, have had no cause whatever to change my opinion. Some schools are mechanically ventilated, others automatically ventilated; and all who pass from the one to the other can tell how much superior the former is to the latter. Her Majesty's Inspector of Schools has stated this several times in his reports; and the Building Superintendent, whom the Board employs from time to time as Architect, is of the same opinion. A retort might be made that the automatically ventilated schools have been badly engineered. I can hardly think this the case, for various experiments have been made on the schools, and, further, Her Majesty's Inspector informs me that the mechanically ventilated schools in Dundee are better than any of the automatically ventilated ones in his district, which is a large one.

Objection has been taken to the cost of mechanical ventilation, which is about 1s. per head per annum, and we are told that automatic ventila-

tion costs next to nothing. I have humbly to submit that experience in this district has shown that automatically-ventilated schools are inferior to mechanically-ventilated schools; that none of your readers have ever been in any long occupied building crowded as schools are, unless when almost all the windows could be opened, which has not been very close; whereas mechanically-ventilated buildings, if properly engineered as they are here, are comfortable and pleasant. With automatic ventilation, to have comparatively good air, there must be increased space. Now, the place of each child in school costs from 10s. to 15s. per annum in ground rent and interest on building. Mechanical ventilation costs 1s. per child per annum, and thus greatly superior atmospheric conditions are obtained at an increase of 7 to 10 per cent. To improve in any similar degree the atmospheric conditions of automatically-ventilated schools would mean immensely more than 7 or 10 per cent. increased space, and in addition the cost of heating would be increased. The complete satisfaction here, both as regards efficiency and economy, with the mechanical system of ventilation is shown in the fact that the Dundee School Board have during the last five years built a number of schools, and no motion has ever been made to put in automatic ventilation; mechanical ventilation is put in as a matter of course. If the automatic system is so good and so cheap, it surely would repay some of the inventors or promoters to put in simple installation in such a place as Dundee, receiving payment only if the ventilation were nearly as good as that of mechanically ventilated schools. I do not intend to enter into a controversy on the subject. I have given my experience, and sufficiently indicated where more information can be obtained if desired.

Barluderry, near Dundee. J. MARTIN WHITE.

The Student's Column.

GEOLOGY XII.

THE NATURE AND USES OF MAGNESIAN LIMESTONES.

NO rocks have evoked more interest or discussion amongst architects than those popularly called dolomites, or magnesian limestones. It is well-known that the Commissioners appointed to inquire into the building stones of this country with a view to the selection of a good material wherewith to build the Houses of Parliament, reported that of all the freestones examined by them none were more suitable for the purpose than the class now under notice. Amongst these they chose the stone from a particular quarry, but for reasons which it is not our present intention to discuss, that stone was used but very sparingly in the structure, and, as a fact, materials from other quarries were entirely substituted therefor shortly after the building commenced. Before the edifice was finished the stone had already begun to decay, and to such an extent that another inquiry was officially held to review the matter, and to suggest remedial measures. This attracted considerable attention at the time, and no wonder that the scientific methods adopted in selecting stone for building purposes were publicly held up to derision. The official inquiry, however, completely dispelled the popular belief in this respect, and it was clearly ascertained that the stone recommended by the Commissioners, in so far as it had been used in the structure, had not succumbed in the slightest degree to the influences of the weather; the stone which had decayed so badly, and which formed the real fabric of the building, especially in that part facing the river Thames, was not that recommended by the Commission. Why the inferior stone should have been used is not very apparent on casual examination, though a tolerably accurate idea may be derived from a careful perusal of the minutes of evidence of the second inquiry alluded to: we would rather not go further into the matter.

From an architect's point of view, the inquiries just referred to have had a peculiar effect in determining the suitability of magnesian limestones for building purposes. After the first Report was issued, the members of the profession naturally became staunch believers in the durability of dolomites; but this belief received a severe check when it was known how the stone in the Houses of Parliament was faring; so deep rooted did the conviction of the worthlessness of the material for building purposes become that a considerable amount of prejudice against magnesian limestones has survived even to the present day. This will no doubt in time be removed as it becomes to be more generally recognised that good and bad varieties of all classes of building stone exist in Nature, and that careful selection at the quarry is competent and disinterested

persons is the prime factor in ensuring durability with comparative facility of dressing. Moreover, the scientific methods of selecting building stone have vastly improved during the past ten years.

After this short digression we may turn to the origin, structure, and composition of dolomite.* The rocks usually known by that name found in England should, strictly speaking, not be called dolomites, as they are unlike the crystalline material occurring over vast areas in the Eastern Alps, to which the term was first applied. It is preferable to designate the British representatives magnesian limestones. Chemically, these are typically composed of about half carbonate of lime and half carbonate of magnesia, but the relative proportions vary with the stone from each quarry, and other constituents are always present. The following table shows the chemical constitution of some well-known magnesian limestones:—

Chemical Composition of Magnesian Limestones.

	Bo-swer Moor.	North Anston.	Stone Ends, North Anston.	Woodhouse.	Linn's Quarry, West-riding.	Steeley.
Carbonate of Lime	51.95	54.80	55.31	52.77	54.22	53.85
Carbonate of Magnesia	40.36	42.00	41.18	44.13	38.86	42.00
Sulphate of Lime	—	—	—	—	—	—
Oxide of Manganese	trace	trace	—	—	—	—
Protoxide of Manganese	—	—	1.66	—	—	—
Carbonate of Magnesia	—	—	1.71	2.43	—	—
Peroxide of Iron	—	—	—	7.2	—	—
Protoxide of Iron	—	—	—	7.1	—	—
Silica	3.64	5.7	10	4.7	1.08	4.2
Water	46	50	44	21	43	12
Totals	98.00	98.58	100.00	99.47	98.18	99.53

The colour of magnesian limestone is usually either yellow or white; it is normally harder (3.5–4.5) than oolite, with a higher specific gravity (2.8–2.95), and is not so soluble in hydrochloric acid.

The origin of magnesian limestone and dolomite has always afforded a fruitful subject for discussion amongst geologists. In some instances it would appear that dolomite is an original chemical precipitate from the saline water of inland seas; in other cases true limestones seem to have been rendered dolomitic by the action of acidulated permeating water containing magnesia, whereby large proportions of calcite and aragonite were replaced by that mineral; or limestones already rich in magnesia may be dolomitised by the proportional abstraction of carbonate of lime, accompanied by considerable alteration and shrinkage in the mass. In regard to immense masses of dolomite such as those in the Eastern Alps, their exceedingly crystalline nature became developed subsequent to their original formation as magnesian limestone.

Geologists have always been puzzled in assigning the class of rocks under notice to their proper division, i.e., aqueous or metamorphic. For our own part we recognise two distinct types of formation in them, one represented by the English rock, such as is built into the exterior of the Houses of Parliament, and which we should term magnesian limestone; the other by the crystalline masses in the eastern Alps, and in the United States, which we should call dolomite. The latter have evidently been rendered crystalline on the alteration of the former by a process akin to the changing of ordinary limestone into marble, to which reference will be made in the next article. Thus we should term the former aqueous (though much modified by the percolation of water), and the latter, metamorphic.

The structure of magnesian limestone is very characteristic. Fig. 1 represents the micro-structure of a thin section of Mansfield Woodhouse stone, magnified 40 diameters, from which it will be seen that it is an exceedingly fine-grained rock, composed of minute crystals of dolomite, whilst here and there grains of quartz or sand make their appearance. The boundaries of the crystals are well defined, and they are occasionally seen to coalesce with each other. The stone is light yellow in colour, very compact, and contains little specks of foreign matter, which, however,

* So called after the French geologist, Dolomieu.
* Compiled from Kars and Cooper, "Mem. Geol. Survey of Great Britain, Vol. II., part II. (1848), pp. 170.

do not form a very appreciable proportion of the whole, and call for no special comment.

To the unaided vision many dolomites have the aspect of very fine-grained, semi-crystalline

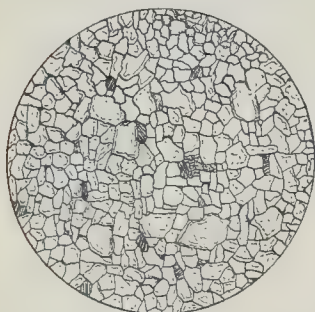


Fig. 1.—Micro-structure of Magnesian Limestone.

limestones; but the student, on comparing this with the micro-structure of calcareous rocks as described and illustrated in the last article, will at once perceive the great difference, microscopically, between the two classes of rock.

Some dolomites are comparatively coarse in structure, and present much analogy with true crystalline limestone (a metamorphic rock) when seen under the microscope. Such a one is illustrated by Fig. 2, which represents the micro-structure (magnified 40 diameters) of a

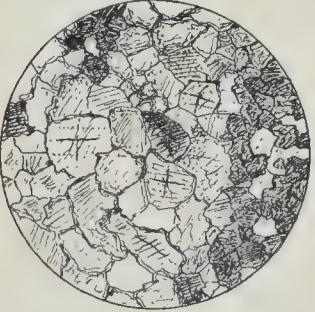


Fig. 2.—Micro-structure of Dolomite.

building stone quarried at Lanesboro, Fillmore County, Minnesota, U.S.A. It is not so compact in structure as the English rock illustrated, and is much coarser; some of the larger grains have traces of the natural cleavage of the mineral remaining, represented by parallel lines, the rhombic form of some of the crystals may also be observed. This structure is frequently accompanied by innumerable minute cavities which render the material unfit for high-class work. The student will therefore understand that the best dolomites should be finer grained.

The magnesian limestones, in addition to forming building stones of many varieties, often make excellent quicklime. The presence or absence of vesicular structure frequently determines their utility from a water-supply point of view, and this feature ought therefore to be studied with much care. The magnesium salts found in many potable waters have often been derived from these rocks. Their manner of weathering is very striking; and where they crop out at the surface they impress their character on the soil. As a rule magnesian limestones make good foundations.

GENERAL BUILDING NEWS.

MEMORIAL HALL, SEAHAM.—The workmen of the Seaham Harbour Bottle Works have organised a movement for erecting a memorial to their late employer, Mr. Robert Candlish. The memorial will be in the shape of a public hall with reading and recreation rooms, on an independent site near the works at Seaham Harbour, which has been designed by Mr. Frank Caws, architect, and the contract for which has been let to Mr. George Graydon, of Durham.

PUBLIC SCHOOLS, JOHNSTONE, RENFREWSHIRE.—At a special meeting of the Abbey School Board, Johnstone, the contracts for the erection of a new public school were under consideration, when the

following contractors were selected:—Mason work, Messrs. William Jaffrey & Sons; joiner work, Mr. Alex. Morrison; slater and plaster work, Mr. George Thomson; plumber and gasfitting, Messrs. J. & W. Weems. The new school is to be erected within the present grounds possessed by the Board at Ludovic-square, and is to accommodate 585 scholars. The cost of the building, which does not include the furniture, is about 3,000*l*. The work will be proceeded with at once. Messrs. Kerr & Watson are the architects.

CHURCH, BARRY, GLAMORGANSHIRE.—On the 6th inst. the new Church of St. Paul, East Barry, was opened by the Bishop of Llandaff. The new church is built of Cattybrook brick inside and out, the exterior being of red and the interior of buff, relieved with bands of bath stone and red brick. The building is designed in the Early Gothic style, and consists of nave, side aisles, south transept, organ chamber, vestries, and chancel, with a tower at the west end and a heating chamber under the transept. The nave is 70 ft. long by 25 ft. wide, the aisles 10 ft. wide, chancel 32 ft. long by 20 ft. wide; transept, 18 ft. by 13 ft. The roof of the nave is an open-timbered one, with tie-beams across, and the roof of the chancel is a barrel one. The arcade is of pitch-pine, with solid upright octagon posts, carried up in one piece to the wall plates. The arches are also of pitch-pine, filled up in the spandril with tracery. The height from floor to ridge is 41 ft., and the total length of the church about 129 ft., by 53 ft., including tower. The first portion of the church now built is the nave, south aisle, and chancel, at a cost of about 2,340*l*. The church, when completed, will accommodate 600 persons, and the first portion now built will seat 470. The builder is Mr. William Richards, of Barry, and the architects Messrs. Kempson & Fowler, Cardiff. The sacristy is laid with Godwin's tiles, and the glass in the nave, south aisle, and chancel, at a cost of about 2,340*l*. The church, when completed, will accommodate 600 persons, and the first portion now built will seat 470. The builder is Mr. William Richards, of Barry, and the architects Messrs. Kempson & Fowler, Cardiff. The sacristy is laid with Godwin's tiles, and the glass in the nave, south aisle, and chancel, at a cost of about 2,340*l*. The church, when completed, will accommodate 600 persons, and the first portion now built will seat 470. The builder is Mr. William Richards, of Barry, and the architects Messrs. Kempson & Fowler, Cardiff. The sacristy is laid with Godwin's tiles, and the glass in the nave, south aisle, and chancel, at a cost of about 2,340*l*.

NEW HALL AND MARKET, ABERFELLY. The new public hall and market-place at Aberfelly, Monmouth, was opened on the 6th inst. The main facade is designed in the English Renaissance style, freely treated. The outside walls and dressings are in Portland cement. The ground floor is mainly occupied by the market, which is fitted up with the usual fittings for stallholders. There are three entrances. The front and side abutting on the street are filled with six lock-up shops, and a balcony is arranged inside the hall and over the shops for the sale of poultry, &c. At the back of the market is a large room. The hall, which occupies the first floor, is capable of accommodating, with the balconies, seats for 1,250 people. Under the stage are the dressing-rooms with separate entrances. The heating apparatus, supplied by Messrs. Hampton, Abergavenny, is on the high-pressure system. The erection of the building has been carried out by Mr. A. P. Williams, builder, Aberfelly, at a cost of 4,000*l*, from the design and under the supervision of Mr. Alfred Swash, architect, Newport.

PUBLIC BATHS, BATLEY.—Public baths, which have been erected at a cost of between 9,000*l*. and 10,000*l*., were opened on the 9th inst. by the Mayor of the Borough (Mr. Councillor J. Auty). The architect was Mr. Walter Hanstock, of Batley. We gave a short description of the new baths in the *Builder* for September 12, 1891.

MISSION CHAPEL, CARDIFF.—On the 6th inst. the St. Ewan's Mission Chapel, Chapin-down, Cardiff, was dedicated by the Bishop of Llandaff. The building, which has cost about 800*l*., is in connexion with All Saints' Church, and will accommodate 320 persons. It is built of red brick with bath stone dressings by Messrs. Cox & Bardo, from plans by Mr. Corbett. The seats are of red pine and the pulpit desk and reading desk of pitch pine.

YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDINGS, ST. AUSTELL, CORNWALL.—Memorial stones of a building for the location of the St. Austell branch of the Y.M.C.A. were laid on the 7th inst. Plans of the new building, prepared by Mr. Snell, architect, of Plymouth, provide for a reading and writing-room, cloak-room, secretary's office, gymnasium, and lavatory on the ground floor, while on the first floor will be a large lecture-hall, capable of being partitioned into class-rooms. The builders are Messrs. W. H. Smith & S. Hunken, of St. Austell.

CATHOLIC CHAPEL, TOTNES.—The Rev. Bishop Graham visited Dundridge, Totnes, on the 5th inst. for the purpose of blessing the chapel designed by Mrs. Kolt Harvey, and dedicated by her to St. Rose of Lima, the patron saint of Peru. The building, which is in the Early English style, and comprises a nave and apse, was designed by Mr. W. M. Tollit, architect, of Totnes, and has been erected by Messrs. Rabich & Brown, of Paignton, in Devonshire brick, faced with Bath stone.

NEW CHURCH, GLASGOW.—On the 6th inst. the memorial stone of the Belmont Church, Hillside, Glasgow, was laid by Mr. J. G. A. Baird, M.P. The building will be cruciform in plan and Early English in style, into which is blended, says the *Glasgow Herald*, a phase of Scottish ecclesiastical work. It consists of a nave 40 ft. wide by 102 ft. long, with transepts on the nave, the transepts being separated from the nave by two lofty arches springing from columns, having moulded caps and bases. The chancel, which is situated at the south

end of the church, is polygonal, and in it are placed the choir seats, communion table, and seats for elders. The chancel steps are of marble, and the entire floor of the chancel will be laid with encaustic tiles. The lower portion of the walls are panelled, the upper part being of dressed stone. The organ chamber, which is a divided one, is placed on either side of the chancel, and is separated from it, as usual, from the nave, by moulded arches. The chancel and nave will have open timber roofs formed of laminated and moulded ribs. The vestry and session-house are also at the south end, and are conveniently situated to the chancel. At the main entrance in Great George-street there is a vestibule extending the full width of the church, the floor of which will be laid with encaustic tiles. Entering off the vestibule is a ladies' cloak-room. A gallery is provided at the north end of the nave over the vestibule, and altogether the church will accommodate nearly 1,000 persons. Under the nave is a hall capable of seating 550, with platform at end, and retiring and cloak rooms. Kitchen accommodation is also provided for the use of the hall. The architect is Mr. James Miller, Glasgow, and Messrs. Guthrie & Co. are the contractors.

PARISH CHURCH, CRATHIE, N.B.—On Monday the Queen laid the foundation stone of the new Parish Church of Crathie. The new church has been designed by Mr. A. Marshall Mackenzie, A.R.S.A., of Messrs. Matthews & Mackenzie, architects, Aberdeen. The site is the same as was occupied by the old building, and the church will overlook the valley of the Dee. It is of Gothic design in the Early Scotch character. A light-grey granite, obtained from a quarry at Inver, about three miles from Crathie, will be employed in building the structure. The stone will be rock-faced. The building is in the form of a cross. From each side of the nave springs a transept, projecting 22 ft., and measuring 25 ft. wide. The outside dimensions of the main building are 120 ft. long by 30 ft. wide. The east end is circular in form, giving an apse for the accommodation of the choir, the organ, and the communion-table. On the outside the walls will rise to a height of 22 ft., while the apex of the roof is 50 ft. from the ground. From the centre of the building will rise a square tower, carried to a height of about 65 ft., and springing from this will be a slate-covered steeple 30 ft. high. The Queen's private entrance will be by the south transept, which will be occupied by the Royal pew. Seats for the heritors and a vestry will be provided in the north transept. The nave will be fitted up with pews for the congregation, the seating numbering altogether about 450, including about 60 in a small gallery in the vestry. All the timber used in the construction of the Queen's pew, the apse, pulpit, and heritors' seat will be oak, while the woodwork in the other parts of the church is to be of selected pitch-pine. The ceiling is arched, lined with wood, and divided into panels with moulded ribs. Around the interior of the church will run a dado of woodwork, 6 ft. high; and above this the walls will be of bare granite. The cost of the church will be between 5,000*l*. and 6,000*l*. The contracts for the work are all held by tradesmen in Aberdeen.

WESLEYAN CHAPEL AND SCHOOL, FISHPONDS, GLOUCESTERSHIRE.—On the 6th inst. foundation-stones were laid of a Wesleyan chapel and schools at Fishponds. The chapel and school, now being erected on the designs of Mr. William Paul, F.R.A.S.A., the front is constructed of blue pennant stone, with dressings of Corsham Down and red Mansfield stones, with the addition of polished Aberdeen granite columns to the nave window and entrance. There are three entrances to the chapel from the front, and there is a communication between each of the porches and the main entrance, and also a staircase from each to the gallery over the principal entrance. The main wall of the front is recessed back at each side, giving greater effect to the side porches, which are in the form of battlement turrets, having truncated roofs with iron crests and finials. A quatrefoil window is placed in the front wall of each of the turrets, which are further lighted by tracery windows at the side. Internally the chapel is about 60 ft. by 41 ft., with a gallery over the main entrance, and two transepts. It has seating accommodation for 450 persons. The ceiling will be polygonal in shape. Immediately at the back of the chapel are three vestries and lavatories, with a heating chamber for hot water apparatus below. The schoolroom is 45 ft. by 38 ft., with four entrances, and is surrounded by glass-rooms of various sizes, separated by removable glazed screens.

PROPOSED WORKMEN'S DWELLINGS, SUNDERLAND.—The Sunderland Health Committee held a meeting a few days ago to consider the plans which had been prepared by the Borough Surveyor (Mr. R. S. Routhwaite) for the erection of workmen's dwellings in place of the present houses in the Hatfield area, which the Council have decided to demolish. The scheme comprised three blocks of brick buildings, two of them of large size and a third smaller building, the cost of each being estimated, respectively as follows:—No. 1 block, 8,400*l*.; No. 2 block, 6,650*l*.; No. 3 block, 1,750*l*.; total, 16,800*l*. The two blocks were to be built round a square area, with a large courtyard to each in the centre for clothes-drying purposes, and were to be three stories high. Galleries were shown running

round the second and third stories, giving access to tenements of two rooms each, namely, a kitchen and a bedroom. Each kitchen would be supplied with water, a slop sink, &c., and to each floor there would be appropriated a range of water-closets, and conveniences for the discharge of ashes by means of a spout leading to a large receptacle on the ground, from which the refuse was to be carted away. The three blocks provided altogether for 96 tenements, or 192 rooms, the accommodation, it was estimated, being sufficient for between 400 and 500 people. This allowed for five persons per tenement of two rooms, and is about the same number as will be dis-
turbance by the demolition of the present buildings. The blocks would abut on two streets, one 35 ft. wide, and the other 30 ft. The committee were able to come to no decision on the plans.

ADDITIONS TO HOSPITAL, LIVERPOOL.—On the 5th inst. an annex to the St. Paul's Eye and Ear Hospital, St. Paul's-square, Liverpool, was opened by the Lord Mayor of Liverpool. The annex will give an addition of twenty-five beds to the institution, at a cost of 1,000*l.* Mr. J. Clarke, of Liverpool, was the architect.

SCHOOL BUILDINGS, LIGHTCLIFFE, YORKSHIRE.—Sunday schools have been built at Lightcliffe for the Congregational Church. The new school, built from the designs of Mr. Thomas Barker, of Lightcliffe, is in the Gothic style, and the cost will be 2,645*l.*

RESTORATION OF ST. NICHOLAS CHURCH, TADMARTON.—The ancient church of St. Nicholas, Tadmarton, which has been closed for a period of five months to undergo restoration, was opened by the Bishop of the Diocese, Dr. Stubbs, on the 6th inst. The church consists of a chancel, nave, north aisle, and a battlemented tower at the end of the nave. The tower is of three stages; the two lower stages, says the *Barbary Guardian*, are of the twelfth century, the upper stage of the thirteenth century. The nave and aisle are separated by three Norman arches of a very simple character, and these arches appear to be the remains of a church of the eleventh century. The chancel is Early English, with some features of late Norman character, and the east window is an insertion of early Perpendicular work. The aisle is tolerably perfect, and has a thirteenth-century doorway. The east wall of the church has been entirely rebuilt. The whole building has been roofed and the greater part of the floor has been concreted. The font has been removed from the west end to a prominent position near the door in the north aisle. The gallery at the west end has been removed, and the space has been converted into a vestry. There has also been erected an approach to the ringing-loft in the shape of a ladder enclosed in a deal panelling. A screen, also, in addition, has been erected a few feet from the west door and extending across the tower, and an oak screen has been put up across the arch. New pews for the entire area of the church, with the exception of the west corner, have been put in, and a new pulpit, also of oak, has been erected. The Norman arcade has been cleaned, the plaster and yellow wash having been entirely removed. The east window in the aisle has been rebuilt, and an oak door has been put in the north entrance. Messrs. Milne & Hall, London, are the architects, and Mr. J. S. Kimberley has carried out the work of restoration.

SANITARY AND ENGINEERING NEWS.

DRAINAGE, SOUTHWOLD-ON-SEA.—At the last meeting of the Southwold Town Council it was agreed to adopt the scheme of Mr. Frederick Beesley, M.Inst.C.E., of Westminster, for the drainage of the borough.

PROPOSED RESERVOIR, MONKSWOOD, BATH.—Local Government Board inquiry was held by Mr. S. J. Smith, at the Guildhall, Bath, on the 5th inst., into the application of the Town Council for the purpose of constructing a reservoir at Monkswood, which will contain 50,000,000 gallons. It had been proposed to purchase springs, and a Local Government Board inquiry was held, but the suggestion was adversely reported against, and a course to storage recommended. The Council had adopted the idea, and now proposed to form a reservoir in the Monkswood Valley. Evidence was given to show that in the driest season there had been sufficient water run to waste to fill a reservoir with a capacity of 50,000,000 gallons, at a cost of 5,000*l.* Mr. Fox, C.E., in answer to the Inspector, said the work would be completed in two years. There was no opposition to the scheme.

PROPOSED WATER SUPPLY, PORTLAND.—On Tuesday last Colonel W. M. Ducat, R.E., Local Government Board Inspector, held an inquiry at the local Board Office, Portland, respecting the proposed new water supply to the island. The local authorities had applied for sanction to borrow the sum of 23,000*l.* for the purpose, the existing sources supply being very unsatisfactory. A well has already been bored in the southern part of Portland, and an abundant supply of water reached, the site has been chosen a few years since by some well-known geologists. There was considerable opposition to the application, principally from some quarrymen of

the island, who seem to think that because the existing supplies were good enough for their ancestors, they will also do for the present. But the population has largely increased during the last fifty years, and we are informed on excellent authority that by reason of the close proximity of cesspools to the wells many of the latter have become much contaminated. A sample of the water which we ourselves examined there the other day left much to be desired, and we think the Local Board are wise in seeking a purer source. There appears, however, to be some doubt as to the actual yield of the new well, and in the end Colonel Ducat was requested to obtain authority for carrying out a pumping test to determine the quantity of water actually available. It is thought that the amount now yielded by the well is practically a minimum in consequence of the dry summer; its quality is excellent. The matter is therefore held over until that important point is settled.

FOREIGN AND COLONIAL.

FRANCE.—A new Lycée for girls is to be built in the Faubourg Poissonnière at Paris, to be called the "Lycée Lamartine." On the Place Vauban, behind the Ecole Militaire, the monument is to be erected to the memory of the soldiers and sailors who have died in foreign countries in the service of France. The Municipal Council of Paris has commissioned M. Dulong, municipal architect, to prepare the plans for a large philanthropic establishment which is to be erected in the XVIIth Arrondissement, and which is to include a refuge for women who have no employment, workshops, and a refectory for paupers. The *Directeur des Beaux-Arts* has just submitted to the Minister of Instruction Publique a list of proposals in regard to the commissions to be given in connexion with the Gobelins manufactory. The list includes the names of MM. Jean Paul Laurens, Gustave Moreau, Vibert, Coquart, and Maurice Leloir. This last-named artist has been already commissioned to execute the cartoon for a tapestry representing "Le Roman au XVIIIe Siècle." The sculptor Bouillon is at present occupied in putting the finishing touches to the monument which is to be erected in the Luxembourg Garden to the memory of Henri Mürger. The monument, which will be placed side by side with that to Théodore de Banville, near the Rue Médicis, will consist of a stele supporting a bust of the celebrated romancier. At the foot of the monument two standing figures will represent two of his heroines. A competition has been opened at Suresnes for the construction of a Salle des Fêtes and a school. At Montbard on Sunday last there was inaugurated a very fine monument to General Junot, afterwards Duc d'Abantès, who was so conspicuous a figure in the wars of the first Napoleon. The monument which has been raised at Dunkerque in memory of the siege sustained by that town in 1793 is the work of the sculptor Lormier. It is composed of a column supporting a winged figure of Victory brandishing a branch of laurel. The pedestal is decorated with a fine bas-relief recording the part taken by the inhabitants in the defence of the town.

In the little town of Senones (Vosges) a monument commemorative of the centenary of the union with France of the principality of Salm-Salm has just been erected. The monument, raised by public subscription, is the work of a Vosges sculptor, M. Descelles. It consists of a pyramid of granite, the square pedestal of which is ornamented with bronze-bas-reliefs. It appears that the Conseil-Général of the Lower Seine and the Municipal Council of Rouen have both formally refused to contribute to the fund required (as mentioned in our last) for the repair or restoration of Rouen Cathedral.

After thirty years of hesitation, the bridge over the Seine between the communes of Puteaux and Neuilly is at last to be commenced. The bridge will bear the name of Sir Richard Wallace, will be 300 yards long, and will cost about 550,000 francs. It will be in two distinct parts, united by a viaduct traversing the Ile Rothschild. There will be two bays on the wider arm of the Seine and two smaller arches on the narrow arm, which is not navigable. The bridge is expected to be completed in the summer of 1895. On Sunday, the 24th, there is to be inaugurated at Andelys the bust of the painter Chaplin, executed by M. Etienne Leroux. The monument will be placed on the square between Great and Little Andelys.

The Conseil-Général of La Vendée has adopted a scheme for the reconstruction of the Hôtel de la Préfecture of Laroche-sur-Yon, which was burned in April last. M. Alfred Picard, Rapporteur Général of the Paris Exhibition of 1889, has been appointed Commissaire-Général of the exhibition of 1900. The death is announced of M. A. C. Benoit-Duportal, a distinguished engineer and a collaborator in the *Revue de l'Architecture* and the *Semaine des Constructeurs*. He was librarian to the "Société des Ingénieurs Civils" of France, and curator of the museum of the "Société Centrale du Travail Professionnel." He died at the age of seventy.

DENMARK.—One of the most remarkable sights in Copenhagen is that of the ruins of the great Royal Palace of Christiansborg, the restoration of which is

urgently demanded of the Danish Parliament. It may be remembered that a fire occurred in the palace on October 1, 1884, and that it was greatly damaged, many art treasures, including famous works by Thorwaldsen, being also destroyed. At the time of the fire the Houses of Parliament were also located in the building, separate from the Royal residence, but after the destruction it was a general public desire that the building should be restored as a Royal residential palace alone. However, up to the present nothing has been done financially except the collecting of a national subscription, freely responded to, towards the rebuilding. But designs, plans, and estimates for the reconstruction have been received from various architects of late years by order of the Parliament. These, however, provide principally for the locating by the building of an additional wing, also of the Rigsdag and the Supreme Court of Judicature in the building, and that the cost of the royal portion, exclusive of artistic ornamentation, should not exceed a sum of 6,000,000 kr. The drawings have been publicly exhibited, and considered by a committee appointed by law, and it is expected that a final decision respecting them will shortly be arrived at. Plans have also been prepared for carrying out the general public desire of restoring the place as a Royal residence solely, and to build a separate Parliamentary house elsewhere. It has, however, been found that none of these plans entirely solve the problems set forth in the Act of Parliament, for the simple reason that the limit of cost is too narrow. To carry out the first-mentioned plans, it is estimated that quite 10,000,000 kr. would be required. In this dilemma a third proposal is now being considered. This is to rebuild Christiansborg solely as a *locus* for the Rigsdag, the Crown Offices, and the Supreme Court, and to render the present Royal residence and four other palaces close by suitable for permanent occupation by the sovereign. This arrangement would keep the cost of the rebuilding of Christiansborg within the prescribed limits, and, moreover, the building could be finished in half the time. With a royal residence it might occupy a whole generation. The new proposals have found many adherents, who urge upon the Government to prepare a Bill for the Rigsdag authorising the immediate commencement of the work, and doubtless, therefore, definite steps will soon be taken. Moreover, it is pointed out that the great work sketched out would provide employment for a large number of professional workmen for some years to come. Christiansborg, by the way has been the official residence of the Danish kings during four reigns.—The "Marble Church" in Copenhagen, on which work has been in progress at long intervals for a couple of centuries, is now approaching completion. We have on several occasions referred to this edifice, built almost entirely of white marble. The church is in reality a cathedral, with all its attributes. The work executed in modern times has been very great, the sum expended in recent years alone amounting to 60,000*l.*, but much is still to be done in the way of decorations, ornaments and fittings, installation of organ, altar, heating, ventilating apparatus, &c. The work of laying the mosaic floor is now being proceeded with. The scaffolding in the interior having been removed, it is anticipated that the edifice may be consecrated for provisional service next spring. However, the interior is somewhat disappointing, although the height of the dome is 130 ft., and the exterior is less imposing by the absence of spires and wings. It is claimed that in diameter the church ranks as the sixth in Europe. From an architectural point of view, however, the interior, with its bold and beautifully carved arches and the lofty ceiling, is very fine, and ranks among the handsomest specimens of modern Gothic work in Europe. The dome represents the sun on azure background, below which are painted the twelve Apostles, 20 ft. in height, the work of the late Professor Olrik and Herr Overgaard. The twelve stained windows are framed with polished marble pilasters. Along the dome runs a gallery with a gilt grille, supported by twelve gigantic columns of grey marble, within which are the reserved pews. In the columns are hollowed eight niches for statues. It is stated that the acoustic properties of the edifice are far from good, this being particularly the case in the centre of the church. It is, for instance, said that words even whispered are re-echoed on the opposite side. The altar will face the main entrance. The church will be lighted by the electric light. There are four entrances. Several eminent architects have had the edifice in hand in course of time, the present being Herr Etatsraad Yeldahl, Crown Architect, who has also designed the twelve large bronze figures of the Apostles adorning the exterior.

The foundation stone of a new important asylum has just been laid by the President of the Copenhagen Corporation, called the Alderstret, a residence for aged artisans, with twenty-five workshops. The main building has a frontage of 268 ft., a depth of 36 ft., and a height of 60 ft., the number of stories being five. In addition there is to be a second building, parallel with the first, 230 ft. in length, and shortly to be commenced, a third but smaller residence being also contemplated. The establishment is to be ready in a year. The exterior is to be treated with more attention to architectural effect

CONTRACTS—Continued.

CONTRACTS.

Those marked with an Asterisk (*) are advertised in this number. Competition, p. lv. Contracts pp. lv., vl., viii., ix. and xxiii. Public Appointments, p. xx.

WATER SUPPLY OF MANCHESTER. Considerable anxiety is being experienced in Manchester as the diminution of the water in the reservoirs in twenty-four days' supply as against forty-nine days' supply on June 19, when the precautionary measure of cutting off the supply at 8 p.m. was adopted, are also as to its inferior quality, and to the fact that the new supply from Thirlmere will not be available until next May or June. At the last meeting of the

LONDON.—For water-mains and hydrants at the Western Hospital, Fulham, for the Metropolitan Asylums Board, Messrs. A. & C. Harrison, Architects, 15, Leadenhall-street, E.C.4.—*£500* 0 0. James Bank Iron Co., *£250* 0 0. Aird & Son (accepted) *£195* 0 0. Johnson & Co., Ltd., *198* 10 0.

LONDON.—Accepted for the extension of the Brooke-road working office, Stoke Newington, for Her Majesty's Office of Works. H. Knight & Son, Tottenham *£565* 0 0.

MARPLE (Cheshire).—Accepted for the erection of new Wesleyan schools, Marple, Cheshire.—G. Grundy & Sons, Middleton. *£1,175* 0 0.

MIDDLETON (Lancs).—Accepted for the erection of a new church and vestry at Rhodes, New Jerusalem Church, Middleton. Mr. T. A. Peto, architect, Long-street, Middleton, Lancs. Quantities by architect.—W. & H. Thorp, Rhodes. *£175* 10 0.

SHEERNESS-ON-SEA.—Accepted for the erection of houses for Mr. A. W. Howe, Messrs. Shearman, architects, Effingham House, Arundel-street, W.C.—Pavey, Sheerness. *£1,575* 0 0.

SOUTHAMPTON.—For erecting new stabling at the Shirley terminus, for the Southampton Tramways Company. Mr. R. M. D. Lucas, architect, 1, Portland-street, Southampton. Quantities by architect.—T. J. Jones *£395* 0 0. F. Osman *£292* 0 0. J. P. Beer *£318* 0 0. C. Barter (accepted) *£287* 0 0. G. Powell. *295* 10 0. (All of Salisbury). Protecting estimate, *£193*.

WHISTON (Staffs).—For a school building, Messrs. R. Scrivener & Sons, architects, Hanley.—Futnison *£591* 0 0. Cooper, Whiston (accepted) *£450* 0 0.

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"The Grove," Harrogate.—Mr. T. Butler Wilson, Architect	Single-Page Photo-Litho.

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Practical Designing.



THAT design should be considered and elaborated with reference to the nature of the material in which it is to be executed is a principle which has now been so recognised among us that it

may be said to have become a truism which it is unnecessary to insist upon. Many designers, however, especially architects who have hardly time to go far into the processes by which their designs are carried out, may still fail to realise the extent to which not merely the character of the material but the process of manufacture may influence the suitability of the design. Looking at a carpet or other textile, we may at once form a decided opinion as to whether the design is a suitable one to be effective in that particular class of material. But a further investigation into the manner in which the design is worked into the material may show that, while two designs may be equally suitable for the material as far as æsthetic effect goes, one of them may be easy to work and the other very difficult. So, again, with such a material as wrought iron, for which designs are not unfrequently made on paper which might look well enough if executed, but which are exceedingly difficult to execute; a spiral or other feature may be designed of a section which would be effective enough in appearance, but which is exceedingly difficult to bend into the required curve; and so on. This element of practical workability, so to speak, runs through almost all materials which are used as vehicles for decorative design; there is the question of what will look best in the material, and behind that the question of what can be executed best.

It is in order to draw further attention to this point, as well as to assist students of decorative design in a knowledge of the practical conditions of various processes as bearing on design, that the handbook bearing the title which heads this article* has been produced, consisting

of a series of short essays on the practical considerations to be kept in mind in designing for various classes of materials and manufactures, and in preparing the working drawings from which the designs are to be carried out. The book is concise in its literary portion, and sufficiently illustrated for practical purposes of exposition; and it is one which ought to be of interest to all architects and decorative designers.

Mr. Millar, in treating of the preparation of designs for carpets, reminds the reader of several points which are very likely to be overlooked by those who have not considered carpet designing from a manufacturer's point of view. The pattern consists of "patches of colour with sharply-defined edges," and has to be so designed, if it is to resemble the design. "The designer should never forget that his sketch must be reduced to a definite number of tints when being put on lines." This is a limitation which it is surely most important that the designer should have fully assimilated before he puts brush to paper at all. There are one or two points touched upon in the essay which are after all rather æsthetic than practical, but which are very important. We entirely concur with the author in the maxim, to which he calls special attention by putting it in italics, that in a carpet "form must always be a secondary matter as compared with colour." There is one point touched upon by Mr. Millar as a reason for this secondary importance of form, viz.: that a carpet in use is always seen, as a whole, in sharp perspective, with the pattern more and more foreshortened as it recedes from the eye. That is important and is doubtless often overlooked. But even independently of that question of perspective, we hold that form is of secondary importance for the reason that the nature of the material is not such as either to define form sharply or to carry out symmetrical forms with complete precision; and this, as we remember remarking in speaking of the Gobelin tapestry exhibits at the Paris Exhibition of 1889, applies just as much to this class of work when hung on a wall as when placed on a floor; and more to carpets than to tapestry, because symmetry of execution

in a design, as far as line goes, is even less under control than in the manual process of tapestry. The object of a carpet is to produce a rich and harmonious colour effect, and Mr. Millar complains that some designers seem to work on exactly the same lines as if they were producing a thing in monochrome. We must refer the reader to the book for the interesting and practically arranged information as to the process of "planting" a carpet design, and the avoidance in a repeat pattern of details which will lead to "striping" when the carpet is seen as a whole—one of the most difficult things to provide against in every kind of repeat design, as many an otherwise pleasing wallpaper testifies; and striping is more likely to develop in the foreshortened horizontal carpet surface than in the vertical wallpaper. We may also draw attention to the note that in designs for the Brussels make of carpets the drawing should not be too thinly coloured, as an effect is produced on paper which is not realised in execution. The designer must face the fact that he is dealing with a colour design which has to be produced mechanically in defined patches of colour, and must define them well in his drawing if he does not wish to be disappointed in the ultimate result. This is a consideration which in fact would apply to all colour design which has to be mechanically reproduced: the designer must guard against being deceived by the effect of freedom of manipulation with the brush which cannot be reproduced in the executed work. In regard to light and shade Mr. Millar observes that the power of indicating this by solid masses of colour is much better developed among French designers than English. He admits that light and shade *should* not have anything to do with carpet design, but urges that the average householder has not arrived at this point yet. Then let him arrive as soon as possible. Why desire to train draughtsmen into a proficiency in representing what it is admitted they ought not to represent?

In connexion with carpets we may take the subjects of "Woven Fabrics" and "Printed Fabrics," treated of by Mr. Arthur Silver. The first-named subject, as the author observes, is practically inexhaustible in the variety of types it includes. A considerable portion of the chapter is occupied with lace, in regard to which we think the illustrations

tributors: Alexander Millar; Arthur Silver; Wilton P. Rice; Owen Carter; R. L. B. Rathbone; Selwyn Image; H. Orrin Smith; and George C. Haité. London and New York: Geo. Bell & Sons. 1893.

* Practical Designing: A handbook on the Preparation of Working Drawings. Edited by Gleeson White. Con-

of symmetrical designs on "panels" are hardly in keeping with the character of the material. The hints as to the sizes and widths commonly used are of practical importance. The illustrations of designs for muslins we like much better, and there is a most useful practical comparison afforded between the drawing for a Madras muslin pattern (Fig. 6) and a portion of the same pattern photographed from the actual stuff. Here the student can compare the effect of the drawing with the result in the actual stuff, which is very different to the eye; Figs. 8 and 9, given with the same object, are even more instructive, and show emphatically how different the effect of the smaller details may be, in execution, from the effect of a drawing (or diagram we might rather say) even when faithfully followed by the manufacturer. In regard to tapestry, which is next considered, the following remarks are worth special attention:—

"In designing for tapestry do not forget that the actual fabric shows an outline composed of small steps or squares; therefore, in drawing your design, it is well, although you use true and actual curves, to remember that they will be represented in the cloth by horizontal and perpendicular lines; very short lines, probably, perhaps, only $\frac{1}{8}$ of an inch, but none the less strictly perpendicular and horizontal, and not curved. Therefore, if you describe a curve which, before it quickens, is in the main horizontal, you will discover it in the cloth as an actual horizontal line; the same holds good of perpendicular lines; consequently, if you draw a small circular figure the result will in all probability be square, or near square, but the greater the circumference of the figure the more expressed, the more faithful will it appear. Therefore, if you make a curve which is very subtle, and inclines in a horizontal or perpendicular direction, it must needs be represented by a true perpendicular or horizontal edge; and unless the feature of the design requires this character, it is well to draw your curves so that they avoid making right-angles to the perpendicular."

It will be well for the reader to turn direct from this chapter to the one on printed fabrics, and realise how absolutely different are the method of execution and the objects to be kept in view in preparing the design, from those of woven fabrics, though to the popular mind both kinds are often indiscriminately classed together as "textiles." The remarks on the method of production of machine-printed cretonnes will enable the reader to realise to some extent the cost, care, and ingenuity of mechanical means which go to the production of this class of work, concerning which the author remarks, "I do not know which is more to be wondered at, the skill brought to bear, or the apathy with which the result is regarded." The subject of "Floor-cloths," treated by the same writer, follows this, being really akin to it, as it is a class of design produced by printing from blocks, though with important variations in the conditions of printing; superimposed colours cannot be used with good result, because the second printing falls on the wet surface of the first; and separately printed outline blocks are almost a necessity; at all events we quite agree with the author that "the outline is an indispensable element in floor-cloth design," and has to be printed with greater force and fulness of colour than the surfaces which it encloses. The process, and the means employed, are rendered clearly intelligible in a small space and by the aid of two or three diagrams. We quite agree that complicated arrangements should be avoided, and that the designer should "endeavour to develop originality in the direction of simplicity," but we should not be disposed to emphasise too strongly the idea that geometrical forms are best suited for this material; this idea may tend towards running too much into the likeness of tile design; in fact it is rather a vice of some of the popular floor-cloth designs that they too much suggest the idea of an attempt to imitate tiling—some of them indeed are obviously designed with this end. To our thinking there has been rather a want of enterprise shown in floor-cloth design, in the too constant adherence to geometrical patterns of a type which cannot have demanded

much thought on the part of the designer. Designs with a certain degree of flow of line in them may certainly be satisfactorily produced in this material, if simplicity and breadth of treatment are observed, and an avoidance of too complicated detail.

Tile design, on the other hand, being necessarily laid down in the form of geometrically-shaped pieces of fixed sizes, must appropriately take geometrical form in its principal divisions at all events, though there may be any amount of freedom of line in the detail contained on any one tile. Mr. Owen Carter, the author of the chapter on the subject, seems to be of the same opinion; that is in regard to pattern tiles. Decorative figures and large floral designs, worked out in a number of tiles each of which supplies a part of the design, hardly come under the proper category of tile design; they may rather be regarded as wall paintings put together in separate pieces. Tile design is essentially design made up from square pieces each of which is complete in itself.

The subject of wall papers completes the class of surface design and is treated, as far as can be in so short a space, by Mr. Haité, who gives a very good outline both of the practical and aesthetic view of the subject, accompanied by explanatory diagrams as to the arrangement of repeats, and some very good complete designs as examples of different kinds of effect. His statement, however, that the more severe the treatment of the design the better it will bear repetition, must, we think, be taken in a modified sense. He says that geometrical figures gain by repetition but that an elaborated pattern often loses by it; but this is hardly in accordance with some of his own examples (Fig. 1 and Fig. 29 for instance) and with the common practice of some of the best designers of the day at present. It would be more correct to say that naturalistic designs lose by repetition. Purely geometrical design in repetition over a large surface hardly produces a wall paper of the highest interest. The great success of paper-designing seems to be to give, in a flowing but conventional design, an impression of continuity in spite of its limited repeats. Mr. Haité's remarks on the true meaning of "conventional" and "natural" in this class of design (page 292) are very well put.

Mr. Selwyn Image's short paper "On the Making of Cartoons for Painted Glass" takes the very sensible and practical form of a description of his own method, which is the best thing that any competent teacher can do in a limited space, as giving what his own personal experience has recommended as the best. He is in favour of frankly recognising the leading—we should imagine every competent stained glass artist will agree with him there—but of keeping its lines and spaces as simple as possible; enclosing a head, for instance, in a simple band of lead, not following the outline in detail, and throwing out the profile by shading between it and the lead; the same with floral forms. We agree with him (he says that some people will not) in thinking that a rather plentiful use of leads—not letting the openings exceed about 8 in. square—besides being of practical value in avoiding the use of large pieces of glass which may be injured in firing, gives a richness of effect to a window which is an artistic gain.

Mr. Rathbone's paper on metal-work is one of the best and most comprehensive in the book, based on the idea that the first thing which the designer of a piece of metal work has to consider is, "in which of its possible conditions or states the metal should be taken, so that it may most readily assume the form which he has in his mind," so that he may avoid the necessity of having the forms altered afterwards from the first design, and the freedom of the lines injured or broken, "this piece to be made thicker or longer, to leave room for the internal construction, or that curve to have its back broken, or to be marred by an unsightly joint, because it cannot be made in one piece." We hardly agree with Mr. Benson

that the British workmen in metals are apt to hold the ideas of designers in disdain, and to take pleasure in overwhelming them with all the difficulties in the way of working out what looks well on paper. That is not our experience, at all events; we have generally found that a good workman, though he may (and very wisely) point out to the designer where there would be a practical difficulty, is rather desirous to afford all the help he can in carrying out a design, especially if it has any quality of novelty and originality.

"Drawing for Reproduction," by the editor of the book, is one of the most useful chapters for architects in these days when photographic reproduction of one kind or another has also entirely superseded engraving. Mr. Gleeson White divides processes for typography into "direct reproduction" and "half-tone" blocks. He is unnecessarily positive in his reiterated demand that the former should be drawn in absolutely black ink; brown produces just as well; the defect is that in the case of blocks to be printed with printed matter, the artist does not realise the effect which his drawing will have, so well as if it is drawn as nearly as possible of the colour it will be printed. The importance, however, to draughtsmen who make a living by making drawings for the Press, or at least increase their income by it, of knowing precisely what kind of drawing will reproduce best, is very great, and the instances Mr. White gives of the refusal of really artistic drawings which would not produce well, and the acceptance of drawings of far inferior artistic quality in themselves, but by a draughtsman who knew exactly how to draw for reproducing, are quite to the point, and such as happen in real life again and again. Considering that the majority of illustrations in architectural papers are now reproduced by photography, the ignorance of architectural draughtsmen on the subject is often extraordinary, as well as to the method of production as the time it requires. We have several times had a request from the author of a drawing to have some slight alteration made, or to have it (in the case of a photograph) printed in some particular tone, on the very day of publishing, in ignorance of the fact that, if a typographical block, it was made and delivered by that time, and if a lithograph, the copies had been in process of printing for the last three days, and were nearly all made. They seem to think a block or a lithograph can be altered at the last moment, like a printer's correction in type. It would surely be worth their while to know a little more than that. Mr. White might have given them a hint on that point, of which he says nothing, perhaps not believing that anyone could require it. A few words as to the style of drawing might have been added with advantage. It is of the greatest importance that line drawings for reproducing should be clean and even in line, for all blurs tend to become exaggerated; and especially that line shading should be in clean-cut lines at even distances, and in general not cross-hatched; a good effect may be produced by cross-hatching if very cleanly done, but not in a scribbly way; the intersections of the lines tend to spread and get lumpy; and moreover shading of this kind, which looks free in the original sketch, tends to become unduly hard and pronounced in the reproduction. All these are matters which should have been distinctly pointed out, and the writer's advice is in these respects rather defective. The author recommends one or two American Indian inks (to use an Irishism) as better than any others for drawings for reproduction. Good Indian ink, as we can get it here, is however generally quite satisfactory.

Apart from the points we have noticed, the chapter contains good general information as to the various styles of reproduction that are practised, and the methods of drawing for them. Mr. White notices, we observe, the system of very great reduction from rather rough sketches which is now often employed. He comments on

the failure of such reductions to a minute scale to give the real balance of tone in the original. There is another point in regard to it open to comment; its effect on the draughtsman. The result is to induce a splashy and careless style of drawing, in which general effect only is looked to and detail disregarded, because it would never be seen in minute reduction, which on the other hand gives a general effect of neatness and finish which is totally absent from the original drawing. The public would be surprised to see the originals of some of the charming and apparently delicately executed small tone-blocks which are produced for the American illustrated magazines. We had the opportunity one day of looking over a considerable collection of sketches of architectural interiors in Indian ink, done for this kind of minute reproduction by an artist of great reputation. These would be reproduced on the rolled paper of the magazine, perhaps about one-tenth the height of the originals, and would then appear, no doubt, as broadly executed but delicate little tone-sketches. The originals were large splashes of Indian ink brush work, powerful in general effect but without a bit of recognisable architectural detail in them; and the editor of an architectural journal naturally felt compelled to hint to the eminent artist, as delicately as possible, that architects wanted some definite indication of detail in the representation of architecture. We cannot think that it is a good or a wholesome system which leads to and encourages such a method of drawing, in which delicacy of effect is to be ensured, and the slurring over of detail compensated for, only by the minimising influence of the camera.

NOTES.

It is openly asserted that the result of the recent ballot of the miners on the three questions alluded to in our issue of the 9th inst. does not accurately reflect the views of the men, sufficient consideration not having been given to the question of resuming work, where possible, at the old rates. Almost immediately after the ballot, some of the miners' agents intimated that they were prepared to ignore the Federation, and to allow any of their men who could do so to return to work at the old rate of wages. This policy has been acted upon in several districts, and more coal is being raised at the present time than for weeks past. This partial resumption cannot fail to have a considerable effect upon the progress of the dispute. An undoubted success is scored by those men who resume, inasmuch as they maintain their position of refusing to submit to the 25 per cent. reduction, "or any part thereof," though their wages will doubtless be ultimately controlled by the terms of the general settlement. It is to be noted, however, that a large proportion of these men were not locked out, having had no notice of reduction. They left their employment of their own accord, or rather at the bidding of their leaders, in sympathy with those who had received notice. The loyalty of the Federation members to the principles of Unionism is thus being severely tested; but, as exemplified at the recent Congress, some of those principles are so purely and unreasonably selfish that they defeat their own ends. For example, the fuel famine, which is rapidly stopping so many industries, is alienating or diverting funds upon which the leaders had evidently relied for support. Many bodies, which might have contributed largely under ordinary circumstances, have enough to do to provide for their own sufferers, thus the dispute. The order has been given to send no coal to the affected districts, although on reflection it would be seen that this course would influence the coalowners of those districts to try and put an end to the strike in order to avoid outside coal displacing

their own. Some of the workmen thrown idle for want of fuel can see this, and their sympathy is being surely alienated. It was reported some time since that the London coal trade was driven almost exclusively to the waterside, but there are many large centres of industry with no such alternative, the result being disastrous to numerous branches of trade as well as to the railways. The importation of Continental coal does not appear to have been much of a success, a fact upon which we may congratulate ourselves.

CORRESPONDENCE continues in the *Times* on the subject of betterment in regard to London improvements. Many people may think that the subject is exhausted, but this is not so, for it is only by dint of reiteration in different forms that public opinion is thoroughly educated. Mr. Baumann in his letter points out that those who would have to bear a betterment rate under the Bill, the betterment clauses of which have been recently rejected by the House of Lords, are small owners with an average rating of under one hundred a year. We cannot think that this is a point against the principle; it matters not who the owners are, whether peers or tradesmen, if the tax is a just one and easy to levy. What we have urged is that the subject is one of such great importance that the principle must be applied to all public improvements from one end of England to the other, if it is to be applied at all, and should be embodied in a Bill such as the present Land Clauses Consolidation Act. There is one thing to be said in regard to the recent rejection of the special clauses by the House of Lords, that public attention will now be more drawn to the question, and that it must be decided on grounds of general principle.

THE papers read before the Geological Section of the British Association were not at all up to the standard of previous years. The President's address, to begin with, was of an extremely elementary character, such as might have been written by anyone possessing a slight acquaintance with the science, and very different to what was expected in the time of Murchison, Sedgwick, and Lyell. If the sole intention of Mr. Teall had been to provoke discussion there would have been plenty of it, but the election of such an authority on petrology was looked upon by all geologists as a fitting occasion for a learned discourse on his particular subject—in which they were sorely disappointed. The paper by Professor Clowes recording the occurrence of barium sulphate as a cementing material of a Nottingham sandstone was of much interest, and will doubtless stimulate others to instigate inquiry on the same grounds. Professor Hull's paper on the water-bearing capacity of the new red sandstone at Nottingham does not seem to be a very wonderful production, and might well have found vent on some less auspicious occasion. The endeavour to define the limits between geology and geography, also, was mere waste of time; the proper limits assigned to each, and recognised long since, were well brought out by Professor Bonney when he remarked that whilst the one was a description of the surface of the earth, the other was a science relating to the whole earth, and that the two were indissoluble. The paper, which occupied a large share of Monday, and attracted the attention of both biologists and geologists, on fossil and recent coral reefs evoked nothing new; and if the advantages of the science from a practical point of view were gauged from what dropped from the speakers on Wednesday, when the claims of the science to be taught in schools were advocated, we should not be surprised to find that their appeal fell on deaf ears. The fact is that the average professor of the science is far too much wrapped up in the

theoretical bearings of his science to know anything whatever concerning the extent of its practical applications, and he is, therefore, unable to state a fair case.

THE Electrical Congress at Chicago has carried off several of our leading electricians, and consequently the subject of electricity is not so well represented this year at the British Association meeting as is usually the case; many papers that would probably otherwise have appeared there, having been read and discussed on the other side of the Atlantic. Of the fragments that remain, not the least opportune in these days of coal crisis is Mr. Albion T. Snell's paper on "The Utilisation of Waste Water-Power by Electricity." Mr. Snell discusses the reasons why water-power, so largely used on the Continent as a source of electrical power, is yet so little used in Great Britain. Chief amongst these are the relative cheapness of coal and the small supply of water-power in the neighbourhood of places where electrical plants would be commercially profitable. He doubts, however, whether coal at so cheap a rate will always be obtainable, and holds that we might well "make the most of such water-power as we have as an adjunct to, if not as a substitute for coal." He instances the water-supply of Liverpool, Manchester, and Greenock, as cases where an enormous amount of power is wasted which might be advantageously used for lighting the various towns in their vicinity. But when he proposes to dam numerous mountain streams which "might thus be converted into reservoirs for feeding turbines," we feel compelled to protest against such sacrilege. A mountain stream has a value which cannot be expressed in £ s. d.

THE discussion of the subject of earth tremors was an interesting feature in the British Association proceedings. Mr. Symons gave the report of the committee appointed to investigate the cause of the sinking of land in the mining districts of the north of England, and reviewed and described various instruments for recording earth tremors. The difficulty in all these instruments seems to be to make them record exactly the kind of tremor they are required to record, and omit the record of accidental tremors, such as those caused by a cart passing. Of course an ideal tremor instrument should be out of the scope of all accidental disturbance. Professor Milne, in his report on the work of the committee appointed to investigate the earthquake and volcanic phenomena of Japan, admitted also that in a violent storm of tremors the recording instrument became irregular in its action and, as he expressed it, "altered its zero," so that accuracy of observation was impossible. This seems to be an inherent difficulty in the attempt to measure earth tremors. The datum is itself on the trembling earth; for ideal accuracy we should require a datum unconnected with the earth's surface. Still, the highly ingenious instruments which have been invented for the purpose have no doubt enabled us to add very largely to our knowledge of the phenomena of earthquakes and tremors. An interesting point to our readers is the announcement by Professor Milne that the committee's reports had led to a practical alteration in the design of bridges in Japan, so as to resist the shock of earthquake at those points in the walls or piers which had previously been found most liable to give way. We hope to get some more information in regard to this subject. In the course of the discussion Professor Lodge made the important suggestion that the weight of water, flowing and receding with the tide, might account for some periodic movements of the earth. He suggested that Liverpool and Birkenhead were probably "tilted" to some extent by the mass of the

Mersey tidal water flowing in between them. There are competent scientific observers in Liverpool who could take up the investigation of this point; the result might be of considerable interest.

AMONG the practical papers read at the British Association we have received reprints of two, one by Mr. Ashwell, of Nottingham, on Warming and Ventilation, the other by Mr. Warner, also of Nottingham, on the Disposal of Refuse. Mr. Ashwell's is an admirable and well-illustrated paper representing the advantage and even necessity, for large public or private buildings, of mechanical ventilation, and the futility of so-called natural ventilation. The writer gives a good many reasons in favour of the plenum system in preference to the vacuum one. There is something to be said for both, but one decisive advantage the plenum certainly possesses in the fact that on that system we can choose where to draw the air from with much more certainty than in the vacuum system.

THE paper by Mr. E. A. Hawkins, at the British Association, on "Science Teaching in Public Schools," should receive the attention of those engaged in education. Mr. Hawkins speaks strongly in favour of experimental teaching, which according to him is neglected in many cases in order to save time and trouble. He has known, he says, "splendid examination results" obtained without a single experiment having been performed by either teacher or pupils, but with what results? One who had obtained a first class in the advanced stage in this way could teach nothing when he became a teacher. It is astonishing, says Mr. Hawkins, what mere drawings on the blackboard will accomplish, in the hands of a clever teacher, towards the passing of examinations; but they are disastrous to real science. We hope these remarks will be pondered.

FROM an account given in the *Leicester Daily Express* of a few days back, there appears to have been some disgraceful work going on at Leicester in the disposal of sewage. It is actually stated that "notwithstanding the frequent official declarations that sewage is no longer discharged into the river from Leicester, men have been found by the police in Corporation-yard in Jarvis-street, emptying human excreta into the river at the rate of some seven tons in a single night." What the Sanitary Committee of the Corporation, upon whom is charged the onus of this disgraceful proceeding, have had to say in their defence has not reached us. As the local journal truly remarks, if the Committee was aware of what was being done, "its offence against the people of Leicester has been grave beyond description."

WITH reference to the arbitration under *Lamb and Another v. The Secretary of State for War*, we may recall the appeal to the House of Lords, wherein, on May 12, 1891, Lord Herschell delivered a long and interesting judgment—in *re* the Attorney-General *v. Emerson and Others*—affirming that of the Court of Appeal. Litigation had extended over twelve years, turning mainly upon a claim by the lords of the manors of Great and Little Wakering, with that of Foulness, whose ownership was traced from before the making of Domesday Survey, to the foreshore itself, as well as to their kiddle (or stake-net) fishery rights. Justices Cave and Mathew, sitting in the Queen's Bench, had given judgment substantially for the Crown, as using the foreshore for the artillery range at Shoeburyness. The Court of Appeal reversed this decision, so far as it was against the defendants, thus allowing their claim to certain parts of the Maplin

Sands as belonging to the manors—namely, all that part of the foreshore over which their fishing rights extended. A survey of 1598 and other evidence seem to show that the physical features of the shore have undergone some change, which, however, did not affect the question at issue. Unity of possession of the two manors of Wakering has continued since 1272; in 1410 they belonged to Joan, Countess of Hereford, who, dying on April 7 in that year, left as her heirs Henry V. and the Countess of Stafford. On partition of Joan's estate in 1421 the manors were assigned to the Countess of Stafford. An account of profits rendered by William Daunger, bailiff during the period 1419-1421, for the Crown, contains many items worthy of notice by antiquaries and students of the topography of this part of Essex. In 1612 Sir George Coppin bought the manor and lands of Wakering for 14,000*l.*, a purchase confirmed by James I. by an instrument (under proceedings for curing defective titles), granting and confirming all "lands within the flux and reflux of the sea . . . adjacent to the aforesaid manors . . . and situate or lying between the manors and the high sea." His lordship held this to be a clear recognition by the Crown that the foreshore between the land boundary of the manors and low-water mark was vested in the manor-lord. In the middle of last century, the Lodwick family came into possession of, and retained until quite recently, parcels of the manor known as Le Sand, Mablyn Swin, and Southcroft. The *Daily News* is informed that in the arbitration case Mr. W. C. Gully, O.C., has issued his award at 32,500*l.* Colonel Lamb and Dr. Moffat claim compensation in regard to 6,200 acres of the Sands required for military purposes by the Government, and to a further 8,000 acres detrimentally affected thereby. The highest valuation for them was one of 192,000*l.*, assessed by Mr. Charles Pierson, of Manchester: Sir John W. Ellis's calculation on the side of the War Office was for 10,000*l.*

"DESECRATING STONEHENGE" is the title of a letter published in the *Standard* of Monday last (18th inst.), by a writer adopting the *nom de plume* "Archæologist." He relates that on a recent visit to Stonehenge he was disgusted to see the ancient pile overrun by swarms of children, who had, apparently, made it the rendezvous for their annual treat. They were scribbling on an erect stone, making a slide down another, and endeavouring to cut their names on a third. We are afraid that a similar account might be given by many an archæologist who has visited those remarkable remains. If school children are absent, the tourist is ever present, and eager to hand down to posterity an indelible record of his visit to this "Temple of the Druids," as occasion permits; and every one knows that the place has for years been the popular resort of picnics and pleasure parties from Salisbury and the neighbourhood. On the first occasion of our visiting "The Stones" (as they are called in the district) we found a large party of cheap trippers playing at "kiss-in-the-ring" within the enclosure. Now and then a vigorous appeal is made to preserve what still exists of the grand old pile; we hear of the erection of palisading and other remedial measures to keep the vulgar from its precincts; the "Ancient Monuments Protection Act 1882" is freely referred to, and then things relapse into their former quiescent condition. There used to be an old man wandering about the place who had a thick stick, and did what in him lay to keep a species of order; but judging from the observations of "Archæologist" practically nothing is now done to stay the hand of the spoiler, and the present state of affairs is as disgraceful as ever. There is comfort in the reflection, however, that, a few years since, the only public-house along the direct road from Salisbury was closed, and that, probably, will have more effect in

checking the stream of "tourists" towards Stonehenge than will any number of legislative enactments.

THE Dunmore Estate, Stirlingshire, will be put up for sale next week. The property extends over 4,000 acres, and the mansion, which was rebuilt, in the Elizabethan style, about seventy years since, stands amongst fine scenery, and overlooks the Forth. Dunmore (or Elphinstone), in Airth parish, has long been a seat of the Earls of Dunmore, descendants of Lord Charles Murray, son of the first Marquess of Athole, and Queen Mary II.'s Master of the Horse, who was elevated to the Scots peerage as Earl of Dunmore in August, 1686. In Airth is the castle, described by Messrs. MacGibbon and Ross, architects, in their work, "The Castellated and Domestic Architecture of Scotland," which is especially noteworthy as exhibiting both the open bartizan, and its successor, the roofed angle-turret, and for the peculiarity and beauty of the ornaments of the tympanum, and careful design of the mouldings, in the east front dormers. One dormer represents fern foliage, the other has a star-spangled field. They assign the castle to, probably, the early years of their "fourth period"—1542-1700: it represents "what had been known as 'Wallace's,' from the circumstance that Wallace surprised and cut off an English garrison quartered therein. Of Dysart, Fifehire, with Ravenscraig Castle and the St. Serf Tower, which will be again offered for sale on the 27th inst., we gave a short account on January 16 last year.

OUR contemporary, the *Engineer*, in its last number, publishes plates from two curious and interesting instantaneous photographs of a large gun by Krupp at the moment of the discharge. The interesting practical part about them (or one of them) is that the first one, taken at the moment after the projectile has cleared the muzzle of the gun, shows the smoke expanding in globular form directly from the muzzle, showing evidence of a great rending force at the point of escape, which justifies the practical wisdom of the older gun-founders in thickening the muzzle of the gun, a device which was probably not adopted merely for "ornament." The point is of interest to others than artillerists, as an illustration of the manner in which an explosive force acts. The photograph shows that the grooves in the rifling of the gun have impressed themselves on the issuing mass of smoke, which is ribbed, somewhat like an enormous melon.

THE "Brown Book" of the Architectural Association, which has been issued, grows thicker year by year, an indication we hope of the continued and increasing prosperity and activity of the Association. The instruction lectures for classes for the session include the following series of lectures:—"The Orders of Greek and Roman Architecture," by Mr. R. Elsey Smith (Greek Travelling Student); "Materials and Construction," by Mr. F. R. Farrow; "Practical Perspective," by Mr. W. G. B. Lewis; "Elementary Physics, as Applicable to Building and Calculation of Strengths," by Mr. R. Holmes; "English Architecture to the year 1500," by Mr. F. R. Farrow; "Materials, their Nature and Application," by Professor Kerr; "Elementary Ornament and Colour Decoration," by Mr. Cole A. Adams; "Stresses and Strains," by Mr. R. Holmes; "General History of Architecture," by Mr. F. R. Farrow; "Geology," by Mr. H. W. Burrows; "Sanitary Science," by Mr. Max Clarke and Mr. Farrow, the latter treating specially of ventilation; "Professional Practice," by Mr. E. T. Hall, who takes as

* Reviewed in the *Builder*, December 25, 1886, January 19, 1887, and August 6, 1892.

his subject "The History of a Commission as affected by Legal Enactments"; "Plane and Solid Geometry," by Mr. R. Holmes; "Colour Decoration," by Mr. J. D. Crace; "Land Surveying and Levelling," by Professor Henry Adams; "Chemistry of Building Materials," by Mr. Farrow; "Quantity Surveying," by Mr. John Leaming; "Practical and Beautiful Design," by Mr. A. Beresford Tite; Lecture on "Painting in its relation to Architecture," by Mr. C. W. Whall; "Sculpture in its relation to Architecture," by Mr. T. Stirling Lee; "Other Arts allied to Architecture," by Mr. Walter Crane. The last nine are noted as "extra subjects." This is certainly a remarkable programme of educational lectures for one society to put forth, and we give publicity to it in order to show those of our younger readers who are not members of the Association what assistance in the study of architecture they may find within their reach by joining it. Among the most interesting in the list of the sessional papers are "How to Study Design," by Mr. A. Beresford Tite (an introduction to the course of class lectures on "Practical and Beautiful Design"); "Hard Wood Joinery," by Mr. H. W. Barnes; "Party Walls," by Mr. Woodthorpe; "Colour in Street Architecture," by Mr. S. B. Beale; "Old Architecture in the East End of London," by Mr. Theodore Moore; and "Practical Remarks on the Working of Wrought Iron, with Examples," by Mr. Henry Longden. The opening meeting, when the President, Mr. E. W. Mountford, will deliver his address, takes place on October 13.

A VERY interesting loan exhibition appears to have been got up at the Museum and Art Gallery at Nottingham Castle, in connexion with the visit of the British Association, consisting partly of works by artists who were natives of Nottingham. Mr. Parkes Bonnington and Henry Dawson among the deceased, and Mr. Edwin Ellis, Mr. Laslett J. Pott among the living, and partly of a special collection of the works of Mr. Walter Duncan. We are not told for what special reason this painter's works were formed an important element in the collection, but we are glad to hear that a collected exhibition has been formed of drawings of a water-colour artist who does not appear to us to have ever received the degree of recognition, by the general public at all events, to which his power as a designer and colourist entitle him, and we recommend those who are in the neighbourhood not to lose the opportunity of seeing this collected exhibition of his works. The catalogue, of which a copy has been forwarded to us, is very well got up, and illustrated by a good many sketches, chiefly of Mr. Duncan's drawings.

BUILDING MATERIALS AT THE CHICAGO EXHIBITION.*

TWENTY-FIVE States and Territories are represented in the Mines and Mining Building by collections of building-stones. One or two States, in addition, make their displays in their own buildings, notably Illinois, so that the total might be increased by a few more. No one system has been followed in preparing the exhibits of building-stones, save that of omitting any formation which would render them of practical use to the architect. This, however, is not so wholly culpable as may appear at first sight, since the building-stones of many of the Western and newer States have not yet been studied by their geological surveys. But this offers no excuse whatever for the lack of scientific information in the older States, which not only have long established geological surveys, but which have published monographs and papers upon this very subject.

Building-stones are shown, in one form or another, by the following States:—Arizona, Colorado, Connecticut, Idaho, Indiana, Iowa, Louisiana, Massachusetts, Michigan, Minnesota, Missouri, Montana, New Hampshire, New

Mexico, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Utah, Vermont, Virginia, West Virginia, Wisconsin and Wyoming. This list includes only States having exhibits in the Mines and Mining Building. Illinois, which makes her exhibit in her own building, is thus omitted, as is Washington, one or two others. Some of these exhibits are small—Arizona, for example, being represented only by some specimens of onyx. But a number of the others are very complete, and, taken with the general collection in the galleries, makes a display which, in point of numbers, in variety of specimens, in richness, and in amplexness of resource, make a creditable and interesting display. Yet there is the same lack of information and the same deficiency in labelling which is so grievous a fault of the topical collection made by the Exhibition authorities.

Several States make really important displays of their resources in building-stone. New York is especially notable in this respect, the specimen blocks being of generous size, cut to show the stone in its natural and prepared state. New York is amply supplied with quarries of building-stone of excellent quality and great variety, many of the larger towns throughout the State being built from stone quarried in their immediate vicinity. The collection of specimens is, therefore, a fine one, both in variety and in quality, though the scope of the exhibit seems to have included no plan whereby this latter element might be ascertained. Special mention should be made of the care shown in arranging the collections, which, in this respect, is superior to that of other State displays. Ohio is another

purposes, gives a characteristic appearance to its cities. Very different in appearance and in quality is the "jasper" of Minnesota, a purple stone much used in the cities of St. Paul and Minneapolis. Both these stones, being of local origin, are not much used in other portions of the United States, and the cities of Colorado and of Minnesota are remarkable in containing buildings of these distinctive stones. The variety of stone used in the larger number of American cities is so great, and the stone is obtained from such varied sources, that the individuality of appearance from this source is scarcely noticeable elsewhere.

It is manifestly impossible to make, in this place, a detailed summary of the building-stones of the United States. The materials for such a compilation are not furnished by the collections at the Columbian Exhibition, while the subject is one of greater interest to American architects than to British. It is sufficient to note that a large number of specimens have been brought together that, considered as a whole, richly illustrate the building resources of America. But the want of scientific data whereby the quality and durability of the stone may be estimated deprives the collections of the larger part of their value. In order to show how varied the resources of the United States are in this field the following table has been compiled, giving the localities, by States, of the more important building-stones. It is based upon the report of Mr. George P. Merrill on "The Collection of Building and Ornamental Stones in the U.S. National Museum," contained in the Report of the Smithsonian Institution for 1885-86 (Washington, 1889):

Geographical Distribution of Building Stones in the United States.

GRANITES.	GNEISS.	LIMESTONES AND DOLOMITES.	MARBLES.	PORPHYRIES.	SANDSTONES.	SERPENTINES.
Alabama	Arkansas ..	Alabama	Alabama	Alabama	Alabama	—
California ..	Arkansas ..	California	California	California	California	—
Colorado ..	Colorado ..	Colorado	Colorado	Colorado	Colorado	—
Connecticut ..	Connecticut ..	Connecticut	Connecticut	Connecticut	Connecticut	—
Delaware ..	Florida	Delaware	Delaware	Delaware	Delaware	—
Georgia	Georgia	Georgia	Georgia	Georgia	Georgia	—
Idaho	Idaho	Idaho	Idaho	Idaho	Idaho	—
Illinois	Illinois	Illinois	Illinois	Illinois	Illinois	—
Indiana	Indiana	Indiana	Indiana	Indiana	Indiana	—
Iowa	Iowa	Iowa	Iowa	Iowa	Iowa	—
Kansas	Kansas	Kansas	Kansas	Kansas	Kansas	—
Kentucky ..	Kentucky ..	Kentucky	Kentucky	Kentucky	Kentucky	—
Louisiana ..	Louisiana ..	Louisiana	Louisiana	Louisiana	Louisiana	—
Maine	Maine	Maine	Maine	Maine	Maine	—
Maryland ..	Maryland ..	Maryland	Maryland	Maryland	Maryland	—
Massachusetts ..	Massachusetts ..	Massachusetts	Massachusetts	Massachusetts	Massachusetts	—
Michigan ..	Michigan ..	Michigan	Michigan	Michigan	Michigan	—
Minnesota ..	Minnesota ..	Minnesota	Minnesota	Minnesota	Minnesota	—
Mississippi ..	Mississippi ..	Mississippi	Mississippi	Mississippi	Mississippi	—
Montana ..	Montana ..	Montana	Montana	Montana	Montana	—
Nebraska ..	Nebraska ..	Nebraska	Nebraska	Nebraska	Nebraska	—
New Hampshire ..	New Hampshire ..	New Hampshire	New Hampshire	New Hampshire	New Hampshire	—
New Jersey ..	New Jersey ..	New Jersey	New Jersey	New Jersey	New Jersey	—
New Mexico ..	New Mexico ..	New Mexico	New Mexico	New Mexico	New Mexico	—
New York	New York	New York	New York	New York	New York	—
North Carolina ..	North Carolina ..	North Carolina	North Carolina	North Carolina	North Carolina	—
Ohio	Ohio	Ohio	Ohio	Ohio	Ohio	—
Pennsylvania ..	Pennsylvania ..	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	—
Rhode Island ..	Rhode Island ..	Rhode Island	Rhode Island	Rhode Island	Rhode Island	—
South Carolina ..	South Carolina ..	South Carolina	South Carolina	South Carolina	South Carolina	—
Tennessee ..	Tennessee ..	Tennessee	Tennessee	Tennessee	Tennessee	—
Texas	Texas	Texas	Texas	Texas	Texas	—
Utah	Utah	Utah	Utah	Utah	Utah	—
Vermont ..	Vermont ..	Vermont	Vermont	Vermont	Vermont	—
Virginia	Virginia	Virginia	Virginia	Virginia	Virginia	—
West Virginia ..	West Virginia ..	West Virginia	West Virginia	West Virginia	West Virginia	—
Wisconsin ..	Wisconsin ..	Wisconsin	Wisconsin	Wisconsin	Wisconsin	—
Wyoming ..	Wyoming ..	Wyoming	Wyoming	Wyoming	Wyoming	—

* Quarries not much worked, though quantity is frequently abundant.

† Small amounts only.

State that makes a fair showing with its building-stone. At the Philadelphia Centennial Exhibition the State erected a building of its stone in Fairmount Park, but at Chicago it has contented itself with erecting a stone enclosure to its space in the Mines and Mining Building. Pennsylvania likewise has an extensive collection, the older and more thickly settled States thus appearing to greater advantage than some of the newer ones whose products may be quite as rich. But this cannot be said of Colorado, the larger part of whose surface is filled by the Rocky Mountains, and which thus produces an extraordinary variety of building-stone. In a few years this industry will doubtless be developed, but meanwhile it is well to point attention to the great variety of sandstones and marbles shown in the form of columns, which make part of this State's display. Visitors to Colorado will readily recognise a reddish sandstone, abundant in the eastern part of the State, and which, being extensively used for building

Comparisons have been made with the State exhibits at Chicago in order to prevent possible errors and omissions, and the list is, therefore, more complete than that contained in Mr. Merrill's report. It may be noted that a great variety of stone is included under the head of "Sandstone," many of which are peculiar to the United States. It has, however, not been feasible to separate these out in the space we can devote to the subject. It should be added, also, that many of the quarries are as yet only slightly worked, and future demands may lead to other discoveries and developments which would add considerably to the list herewith submitted.

In bricks and brick-making clays the United States takes the lead, as it does in building-stone. With the exception of artistic tiles, the other countries contribute very little to this department. The British collection is small, though several firms send collections of cement, sand, and fullers'-earth. The single exhibit of glazed brick is made by the Farnley Iron Company,

* Continued from p. 206 ante.

Limited, of Leeds. The State collections in the Mines and Mining Building contain a considerable variety of bricks and clays. That shown by the State of New York is the largest and most comprehensive. Though the specimens are few in number, they are taken from a great variety of sources, and the clay products of the State are, in consequence, very well illustrated. The collection includes building-brick, fire-brick, stoneware, and clays. Several sections of drain-tile are shown, some square in section, others circular within a square, while still others are oval, within and without, made in various sizes and sections. A few tiles are also shown. Pennsylvania comes next in completeness of clay exhibits, and shows quite an extensive line of the famous brick products of that State, especially of brick from Philadelphia and its near vicinity. Bricks and clays, or clay products, are also shown by the States of Colorado, Indiana, Iowa, New Mexico, Virginia, West Virginia and Wisconsin. As brickmaking clays of very good sort abound in nearly all the States, it will be seen from this list that the exhibits under this head are notoriously incomplete. In fact, were it not for the collections made by the States of New York and Pennsylvania, this industry would be scarcely represented, since the collections made by the other States are small and unimportant.

The most important brick exhibits are not placed in the Mines and Mining Building, but in the Manufactures Building, where they are classified in Group 91 of "Ceramics and Mosais." The collections we have thus far been considering are classed under Group 46 in the Department of Mines, Mining, and Metallurgy; Class 304, "Clays, kaolin, silex, and other materials for the manufacture of porcelain faience, and of glass, bricks, terra-cotta, tiles, and fire-brick." The exhibits in the Manufactures Building are in Class 574, "Bricks and terra-cotta for building purposes, plain and enamelled," &c. This is an instructive illustration of the manner in which allied subjects may be separated when their organic connexion, which, in this instance, happens to be architectural, is ignored.

The foreign exhibits in this group may be passed over, since there is nothing calling for a moment's consideration, though an exhibit of Adamant Stone by Francis & Co., Ltd., London, may be mentioned. In the American section the exhibits are more numerous, and several are of great interest. The most notable exhibit is that made by the Hydraulic Press Brick Co., of St. Louis. This company has branches in nine of the chief cities of the United States, and manufactures a very large line of brick, the special quality of which is that it will not absorb water. Its exhibit is in the form of a series of rooms, open at the top, and built of its products, the walls being lined, within and without, with specimen bricks, plain and moulded, and of various colours. It is arranged with excellent taste, and is one of the most striking exhibits of constructive architecture in the Exhibition. The range of colours is very large and extremely good.

Another notable exhibit is made by the Pioneer Fire-proof Construction Co., of Chicago. This firm, as its name implies, manufactures fire-proof building materials, and its products are extensively used in high buildings and other important structures in America. Its exhibit is designed to illustrate its great variety of products, and includes examples of hollow tiles, glazed and unglazed, used for walls, chimneys, enclosures, &c., and the same products applied to floor construction in flat arches between T beams, known as the "Johnson Patent End Section Arches," or in segmental arches filled in with cement and useful for long spans. Suspended ceilings are also shown, consisting of light tiles held by T irons. A similar method of support is applied to roofs, which are likewise shown. Further specimens illustrate fire-proofing applicable to iron columns. Though the products of this firm are especially intended to be applied to the fire-proof construction of large buildings into which no wood enters constructively, it also undertakes to apply its method to wood buildings, practically by lining them with the fire-proofing. The chief application of this method, which is said not to amount to more than eight per cent. on the original cost, would be in fire-proofing old buildings or structures erected before this system came into vogue. While the exhibit is not large, it is especially notable in being almost the only exhibit in the whole Exhibition which illustrates the latest development of constructive architecture in the United States.

Fiske, Homes, & Co., of Boston, Mass., make an interesting exhibit of "Boston Brick Ashlar."

This comparatively new product is intended to replace stone as a building material, and is made in blocks of various sizes, generally with a rough surface, so that a wall built of it approximates a stone wall in appearance. The blocks are heavy and the range of colours good, and while there can be no good reason for making it in direct imitation of stone, it would seem as though, in the somewhat massive effects obtained from it, there might be some advantages in substituting it for stone. It is unquestionably better able to resist fire than any popular sorts of building-stone, but as at present manufactured it is too needlessly an imitation of another material. A somewhat similar substance is shown by the Douglass Moulded Brick Stone Co., of Salem, Ohio, which makes an artificial stone or brick, its specialty seeming to be the impression of various ornaments upon the stone—a system which can neither be commended, nor does it give satisfactory results. The North-Western Terra-Cotta Co., of Chicago, manufactures the same product shown by Messrs. Fiske, Homes, & Co. The exhibit includes photographs of a number of important buildings in which this material has been used, among which may be found some of the newer and more important business buildings in Chicago. The exhibit is in the form of an attractive pavilion built of the products of the company.

The Graham Pressed Concrete Co., of Chicago, make a small exhibit of pressed concrete as a building material. They use a powerful press for pressing the concrete into shape, and produce building and ornamental blocks which are claimed to be suited for every purpose of building. The concrete is made of granite chips and Germania Portland cement, the proportion varying somewhat with the size of the block to be made. A block 4 in. by 12½ in. by 14 in. supported 538,200 lb. before fracture was observed. Pressed designs are shown, together with plain building blocks. The Tiffany Pressed Brick Co., of Chicago, show samples of brick in cases.

The exhibits of woods in the Forestry Building may be conveniently considered in this connexion, and we shall thus have practically exhausted the subject of building materials at the Columbian Exhibition. The exhibits in the Forestry Building, which is located at an extreme corner of the grounds, behind Agricultural Hall, with which, doubtless, it is somewhat connected in the minds of the Exhibition authorities, are extremely good and intensely interesting. We do not remember to have ever seen a finer display of woods than may be found here, and the exhibits are not only fine in themselves but are very complete. The displays are made chiefly by the different States, though several foreign countries are represented. In arrangement, therefore, the contents of this building are somewhat similar to those on the main floor of the Mines and Mining Building.

Foreign countries may be considered first. These exhibits are naturally not large; the most important are those of the Argentine Republic, Mexico, New South Wales, and Japan. Several displays from the West Indies are also made. Of the foreign collections the most interesting is that made by New South Wales. The energy displayed by this colony in illustrating its resources at the Exhibition is worthy of the warmest praise, and the collection in the Forestry Building is not the least important. The exterior of the pavilion is lined with native boards of great size, most of them taking a fine polish and having a good range of colours. The boards are among the largest in the building, and are only exceeded in size by some of the monster boards from California. Photographs of trees and many lesser specimens of wood products add to the interest of the collection. A very interesting collection of woods from Trinidad is shown. The most striking is the "Purple Heart," an extremely beautiful wood, taking a fine polish and of a rich purple colour. It occurs plentifully in Trinidad, and would seem to be an effective material for interior work.

The greater part of the exhibits in the Forestry Building, as in all other buildings, is made up of American displays. It is impossible to speak too highly of the extraordinary beauty of the displays nor of the care taken in their arrangement. New York, which leads in so many departments, is well to the head here in the care with which its collection has been arranged, and in the completeness of its exhibits. A full line of specimens of the chief woods of the State is shown, illustrating their natural growth and natural and polished surfaces. These blocks are supplemented by transparencies of thin sections of wood and by photographs of trees, so that the whole subject of

forestry in its natural and manufactured relation is amply illustrated. Similar care is manifested by other States, and the collections made by the great timber-bearing States are very good. A number of them show large photographs of the trees. One or two States show interior fittings made of its native woods, employing as great a variety as possible, and generally arranged with excellent taste. A few individual firms make similar exhibits, the most notable being a large room decorated and fitted up by the Southern Lumber Manufacturing Company. A fine and rich exhibit is made by the State of California, whose wood products vary from those of the temperate zone to those of the tropics. The most striking object in this collection is a huge section of a redwood tree. This plank is 16 ft. 5 in. wide, 12 ft. 9 in. long, and 5 in. thick, and was cut from a section of the trunk 28 ft. from the ground. It is not part of the California exhibit proper, but is exhibited by Berry Brothers, Limited, of Detroit, Michigan, as an advertisement for their varnishes. Further examples of California woods are placed in the California State Building. A few firms also exhibit veneers, varnishes, and the like.

On the whole, the Forestry Building is an extremely satisfactory one to visit, for it is almost the only structure on the Exhibition grounds in which a general plan of arrangement and selection has been carried out. At the same time it is to be regretted that the scope of the Exhibition did not include the publication of handbooks which would put the information hinted at by the contents of this building, but not made public by its present state, into the hands of the people. Here this has been done in connexion with the Forestry and the Mines and Mining Buildings the exhibit of certain grades of building materials would have left little to be desired.

THE BRITISH ASSOCIATION.

THE annual meeting of the British Association was opened at Nottingham, in the University Hall, on Wednesday, the 13th inst., in the presence of a brilliant assemblage of scientific men. This is the second occasion on which this town has been selected for the annual gathering, and about 1,600 tickets were taken on the day.

One of the novel features of the Nottingham meeting was the collection of scientific apparatus and exhibits, which were arranged in the physical and chemical departments of the College. Amongst them we may notice an instrument for registering the intensity of earth tremors, designed by Professor Milne, F.R.S., and called a tromometer. It consists of a rigid vertical support with a horizontal needle loosely attached to it; the needle carries a vertical mirror, and any movement which slightly tilts the support will cause the needle to move considerably, and the motion can be registered by a beam of light thrown on the mirror. Another exhibit by the Cambridge Scientific Instrument Company was Callendar's platinum pyrometer, an electrical apparatus for determining high temperatures in furnaces from the change of electrical resistance of a platinum wire when exposed to the high temperature. The Rev. F. J. Smith had a series of photographs called "inductoscopes," taken by an electric method, previously alluded to in our columns. The magnetic curve tracer described by Professor Ewing at last year's meeting of the Association was also on view. Messrs. Pyke, Harris & Co. exhibited a laboratory alternator and a transformer; and several manufacturing firms set out their best and newest scientific apparatus, making altogether a useful and interesting exhibition.

On opening the session, the retiring President, Sir Archibald Geikie, F.R.S., informed the members that the affairs of the Association were in a satisfactory condition, and briefly introduced the new President, Professor Burdon Sanderson, who then delivered the inaugural address.

The Oxford Professor commenced by alluding to the immense advantages the company has reaped through the work of the Association, and to the smallness of the pecuniary aid received from public sources by scientific institutions in this country, as compared with some other nations, in consequence of which foreigners have gone ahead of us in several departments. He addressed chiefly dealt with the status and development of Biology, into which it is not our province to enter. Students of Sanitary Science, however, might take note of the following. The President said it was possible that many members of the Association were not aware of the unfavourable position he would not say discreditable—position that the country at present occupies in relation to

scientific study of the causes and mode of prevention of infectious diseases. In respect to administrative efficiency in matters relating to public health, England was at one time far ahead of all other countries, and still retains its superiority; but as regards scientific knowledge there were, in this subject, as in others, content to borrow from our neighbours. Those who desire either to learn the methods of research, or to carry out scientific inquiries, have to go to Berlin, to Munich, to Breslau, or to the Pasteur Institute in Paris to obtain what England might long ago have provided. For us, from the spread of our race all over the world, the prevention of acute infectious diseases is more important than to any other nation. He hoped that the efforts now being made to establish in England an institution to further investigate that subject would result in complete success.

On the second day of the session, Thursday, the addresses of the Presidents of the various sections were delivered, and a few papers read and discussed. Mr. R. T. Glazebrook, F.R.S., President of the Section of Mathematics and Physical Science remarked that the Conference at Edinburgh on electrical standards had been followed by important results. Its resolutions and definitions had been adopted by the Board of Trade, and accepted by France, Germany, Austria, and Italy; and there was good reason to believe that the Chicago Congress would ratify them. The British Association Committee, co-operating with foreign physicists had thus secured international agreement concerning electric units and standards. Speaking of the physical papers of the past year he mentioned amongst others Mr. E. H. Griffith's re-determination of the mechanical equivalent of heat—a work that had taken five years to complete. With the exception of one group of experiments, the results were by less than one part in 10,000, and they showed that 4'194 million ergs of work are required to raise one gramme of water one degree centigrade at 15 deg. C. Professor Dewar had during the year continued his experiments on the deflection of oxygen and nitrogen on a large scale; to the physicist the most important results of the researches were the discovery of the magnetic properties of liquid oxygen, and the proof of the fact that the resistance of certain pure metals vanishes at absolute zero. The remainder of the address dealt with the theory of light, and gave a historical review of the progress made in that branch of science, especially during the last few years.

The President of the Geological section, Mr. J. Harris Teall, M.A., F.R.S., discussed the theories relating to the origin of rocks; after which Professor E. Clowes described a Nottingham sandstone containing barium sulphate as a cementing material. He had not been able to obtain evidence of a similar sandstone in any other part of the country. Professor Hull read a paper on the water-bearing capacity of the new sandstone of Nottingham; in the course of which he remarked that few towns in central England were more favourably situated for purposes of water supply than was Nottingham. Mr. Herbert Bolton, of the Manchester Museum, contributed some observations on the Skiddaw limestones of the north of the Isle of Man.

Mr. Jeremiah Head, C.E., Past Pres. Inst. Mech. E., the President of the Mechanical Science section, confined his address chiefly to showing that mechanical science is largely indebted to mechanisms as they exist in nature, if not for its origin, at all events for much of its progress hitherto, and that we must still look to Nature for future guidance. Mechanical science, he said, had been built up entirely upon observation and experiment, and the natural laws which had been induced therefrom by man. The decisive theories which in modern times man had gained over matter, and over lower animals, had been due to his use of power derived from other than natural sources. That power had invariably proceeded from the combustion and the destruction of fuel, the accumulations of which in the past were necessarily limited. Mechanical balances involving the consumption of fuel had for a century at least been multiplying with alarming rapidity. Terrible waste of fuel was being going on in almost every department of use; even Nature's stores were exhausted they could never be replaced; they had been drawn upon to an extent for 1,000 years, and extensively for more than 100. Authorities said that another 100 years would exhaust all the more accessible supplies. A paper by Mr. Worby Beaumont on the "Automatic Balance of Reciprocating Mechanism" was then read, as also were others

descriptive of local industries dealing with lace and hosiery machinery.

On the third day, Friday, Professor Lodge, F.R.S., gave an account of the progress of his experiments made with a view of ascertaining the behaviour of ether near matter, and he did not now think there was any mechanical connexion between the two. Mr. E. H. Barton and Mr. G. U. Yule read papers on "Phenomena Presented by Electric Waves in Wires," the former dealing with interference phenomena arising from reflection at points where the nature of the conducting wire is changed, the latter with the effect of electrolytes and dielectrics introduced between the conducting wires.

The Geological and Geographical sections combined to listen to a discussion on the limits between geology and physical geography; after which various papers not possessing any features of interest to our readers were disposed of.

In the Economic Science and Statistics section, Mr. E. Cannan, of Oxford, contributed a paper of much interest at this juncture as bearing on certain phases of water-supply. It pointed to the diminution of the net immigration from the country into large towns. Contrary to the general belief that the population of the great towns is being increased almost as much by immigration as by excess of births over deaths, the excess of immigrants over emigrants, or net immigration, is rapidly diminishing, and seems likely to disappear before the end of the century. The net immigration into London in the last ten years was only 56 per cent. of what it was in the previous ten years, and only 63 per cent. of what it was thirty years before, when the population was two and a-half millions less than it now is. In this matter London is by no means in advance of the other great towns. In Liverpool the net immigration was 68,000 in 1851-60, 56,000 in 1861-1870, 49,000 in 1871-1880, but in 1881-1890 the balance was the other way, and there was a net emigration of 15,000.

In the Mechanical Science section two practical papers were read on "The Utilisation and Disposal of Town Refuse." Mr. C. C. Keep said that it was possible to provide power for generating electricity by the use of Fryer's destructor and the thermal storage which it provided. Mr. W. Warner, in the course of an elaborate review of the methods adopted in the towns of this country for disposing of and utilising refuse, comparing them in cost and efficiency, concluded that electric light, produced by burning refuse, can show economical results only in very exceptional cases. Mr. Elliott urged that the refuse had to be destroyed in any case, and, therefore, the cost of burning it was not to be reckoned. Professor Unwin doubted whether the heat from burning refuse could not be more profitably applied to producing power than to producing electricity. Mr. Frank Ashwell then read an exhaustive paper in which he advocated the plenum principle as opposed to the vacuum principle in the ventilation of buildings, contending that the plenum system had succeeded wherever it had been properly carried out.

In the section of Anthropology Professor Hildebrand dealt with the subject of Anglo-Saxon remains and coeval relics from Scandinavia. From the resemblances between the weapons, implements, ornaments, and other objects contemporary in point of age found in Scandinavia and in this country he argued that there was an extensive communication between Britain and Scandinavia prior to the Anglo-Saxon conquest—a conclusion combated with some degree of warmth in the discussion which followed. A communication was subsequently made by Mr. Romilly Allen "On the Origin and Development of Early Christian Art in Great Britain and Ireland," the object of which was to trace the various decorative elements found in early Christian art in Great Britain to their source, and to show in what way the native styles of art existing in this country at the time of the introduction of Christianity (circa A.D. 450) were influenced, first by the Italo-Byzantine art which came in with the importation of the illuminated manuscripts used in the service of the Church, and subsequently by the coming in contact of the Anglo-Saxon and Scandinavian conquering races with the Celtic and other populations already inhabiting the British Isles. Early Christian art in this country is essentially decorative, and to a lesser extent symbolic. The conventional grouping and general treatment of the figures subjects show that they were obviously barbarous copies of Byzantine originals.

Saturday was more or less a holiday in the sections, but the Mathematics and Physical Science division met to discuss an important

paper by Professor Rücker on the "Magnetic Shielding of two Concentric Spherical Shells," one of the objects of which was to demonstrate the most efficient means of preventing a magnet from creating disturbances in surrounding objects. It arose out of the objections by the authorities of the Royal College of Science, and the Central Institution to the proposed course of the South London Electric Railway, on the ground that the magnets moving on its cars would interfere with scientific experiments in their laboratories. The problem could be solved by surrounding the magnet with a very thick iron sheathing, but such a proceeding would add to the weight to be carried on the cars. He had endeavoured to ascertain the thicknesses and radii of two shells in the form of concentric spheres which would give the greatest amount of screening effect obtainable for a given mass of iron.

In the section of Anthropology, Dr. J. H. Gladstone made a communication on "Ancient Metal Implements from Egypt, and the Discoveries of Dr. Flinders Petrie and Mr. Bliss at Tel-el-Heyi." At this place there was a very high mound made out of the ruins of successive towns which had been built, one on top of another, each having been constructed on the ruined remains of its predecessor. This mound had furnished certain chronological details from the time when the Amorites first settled there, until the fall of the place when in possession of the Israelites. As the mound was ascended, there was a change in the materials used for ornament, defence, &c., from copper to bronze, and from bronze to iron. The lead and silver ornaments found were very pure. In the course of the discussion of a paper by the President of the section, Professor Sayce said that a few years ago he found in Upper Egypt, on the eastern bank of the Nile, the remains of a Roman convict settlement, near a range of limestone cliffs, which the convicts were employed in quarrying. Near the foot of the cliffs he discovered a number of flint implements, like those exhibited at the meeting, which he thought must have been used as saws.

On Monday the Mechanical Science section was principally occupied in discussing electrical questions. Mr. Albion T. Snell read a paper on the "Utilisation of the Waste Water Power by Electricity," the principal object of which was to indicate the existence of water-power in various parts of the country available for the purpose. There is a fall of 500 ft. in the water conduit from Lake Vyrnwy to Liverpool, and there must consequently be a considerable quantity of power in it. The series of artificial lakes forming the Manchester waterworks might be utilised to drive turbines and give electric energy for lighting the various towns in their vicinity. The watershed behind Greenock had a fall of many hundred feet.

In the section of Anthropology, Mr. Bloxam read the report on the exploration of ancient remains at Aksum, in Abyssinia, drawn up by Mr. Theodore Bent. Special attention was given to the study of seventy monoliths, in all stages of development, which he found there, the results having chiefly a philological bearing.

At a meeting of the general committee of the Association in the afternoon, it was resolved that the meeting of 1895 should be held at Ipswich.

Tuesday was a busy day with all the sections. In the department of Mathematics and Physical Science the President read the report of the Electrical Standards Committee and subsequent papers were of a cognate nature; or dealt with certain kinds of galvanometers, interference experiments, metals for reflecting telescopes, &c. The question of the methods of publishing scientific papers was introduced, and also the teaching of physics in schools. The Chemistry and Mineralogy Section was mainly occupied by a discussion opened by Professor Dixon, of Manchester, on "Explosions in Coal Mines." The section of Geology advocated teaching the science in schools, and then passed to the consideration of glacial theories; whilst the currency problem absorbed the attention of the Section of Economic Science and Statistics.

The Anthropologists considered the structure of lake dwellings. In this communication Dr. Munro described the various methods adopted by the lake dwellers in the construction of the under structures and platforms on which their huts had been placed:—(1) Pfahlbauten, or pile-structures proper; (2) solid basements of wood, or islands made of mixed materials, crannogs, fascine structures, &c.; (3) cellular basements of beams arranged like the logs of a house. After noticing the fragmentary indications of huts collected from time to time on the sites of lake-dwellings, the author described some

recent discoveries at Schussenried, Württemberg, and in Argyleshire. Professor Herdman read a report on the excavation of a stone circle on the Meayll-hill, Isle of Man. The circle was about 50 ft. in diameter, and consisted of graves, underneath the floors of some of which were found flint implements, arrow-heads, &c., with pottery. Mr. Arthur Bulleid described a British village of marsh dwellings discovered by him last year near Glastonbury. The foundations or floors of the dwellings were constructed in the following manner.—On the surface of the peat was a layer or platform of timber and brushwood kept in place by numerous small piles at the margin. On this a layer of clay was placed, slightly raised at the centre, where the remains of a hearth were generally found. The dwelling itself was composed of timber, filled in with wattle and daub. Not only were the wall-posts found *in situ*, but also the entrance threshold and doorstep. Professor Boyd Dawkins also made a communication on the subject.

The only section which had occasion to meet on Wednesday was the Geological, in which attention was chiefly directed to the structure of certain igneous rocks. The nineteenth report of the Committee on the Circulation of Underground Water was submitted; the final report will be presented next year.

At the concluding meeting of the Association the usual compliments were passed. The Marquess of Salisbury is nominated President for the Oxford meeting in 1894.

ITEMS FROM A MEDIEVAL ACCOUNT BOOK.

THE following items have been copied from the manuscript private account book of the last prior but one of the Benedictine monastery serving Worcester Cathedral before the Reformation. The book is now the property of the dean and chapter; it is a folio volume, of paper, and bound in vellum.

In this article the contractions in the MS. have been expanded and the thorn letter *p* is represented by *th*.

With the exception of repetitions this article probably represents the various constructive items carried out at the prior's private expense during his tenure of office.

Of Prior More, Dugdale writes: "William Moore, sub-prior, was presented with his confreres to the bishop, September 27, and nominated by him October 2, 1518. He resigned the priorship at the beginning of the year 1536, and had the manors of Crowle and Grimley assigned to him."

Dugdale (from Leland's "Itinerary") quotes, "Placis belonging to the Prior."

Batnall, a mile out of Worcester, with a parke and pooles.

Gryley, a three miles above Worcester prope Severn, agayne Omberley, in ripā dextrā Sabrinae.

Halow, a park without a horse a two miles from Worcester.

Croule, a four myls from Worcester.

More prope Tende, a ten myles from Worcester prope fines Herefordshire."

Items.

"Leaf 33.—Item, payd to thomas peynter for peynting the bordures in the lyttel parlour withyn the lyttel haule . . . v. s. iij. d.

Leaf 34.—Item, payd to wurkemen for gyldeing at the dey poole at batnall . . . ii. s. iij. d.

Leaf 34.—Item, payd for paynes of seyntes, with steyned clothes, pawpers, & cetera, for the hangyng of chambers . . . xi. s.

Leaf 35.—Item, for ij turned stoles . . . viij. d.

Leaf 35.—Item, for linnen clothe for bordures to peynt for the hall at grymley . . . viij. d.

Leaf 36.—Item, for A Ax, a hatchet, pynsons & cetera . . . xvj. d.

Leaf 36.—Item, payd to John berow for carage to the mere at grymley for the leyng of the trowh . . . xvj. d.

Leaf 36.—Item, to John church for makyng of a trowh to the water courses at bale broke . . . iij. d. viij. d.

Leaf 43.—Item, payd to thomas Stilgo for gyldeing & peynting of the ymagines of Jhesus our lady in the myddes of the awter in seynt Cecilis chappell . . . xxviii. s. iij. d.

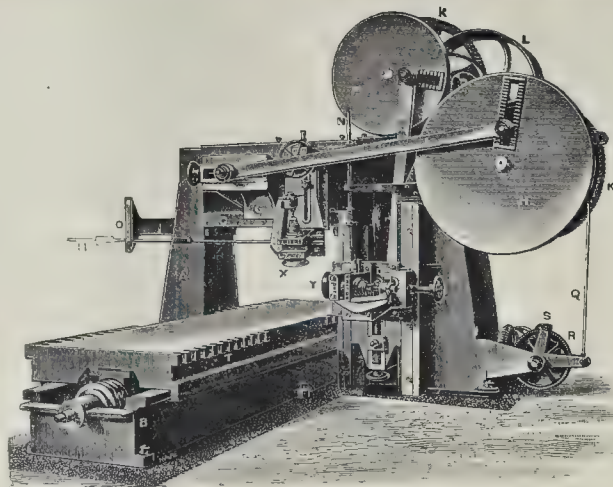
Leaf 43.—Item, the gyldeing of al the other ymagines with the curtesns . . . x. li. vj. s.

Leaf 45.—Item, the new clansyng of Whitnell parke at grymley besydes mete & drynke & the warke of my nown seruauntes . . . xxxiiij. s. viij. d.

Leaf 45.—Item, xxij. c. of pale, & the paylyng therof, at halow parke cost . . . cliij. s. iij. d.

Leaf 45.—Item, the new makyng of the flud yeate at Whitnell poole, without mete & drynke . . . xix. s. x. d.

Leaf 46.—Item, to John fullis, carpynter, & iij with hym, abowte my fathers hows at grymley . . . liiij. s. ix. d.



Trice's Double-Action Stone-Dressing Machine.

Leaf 46.—Item, to thomas sovren for a quarter of wyndyng rodde to my fathers hows . . . xviij. d.

Leaf 48.—Item, payd for hynges & hookes & nayles . . . x. s.

Leaf 48.—Item, to Richard Stawnton for thatchyng of parte of the same hows . . . vj. d.

Leaf 48.—Item, to certain tenauntes for carage of thornes, stakes, to Whitnell parke . . . xliij. d. x. d.

Leaf 48.—Item, to John Berowe for carage of cley, sond, and bryckes to my fathers warke . . . ijs. x. d.

Leaf 48.—Item, to ij Sawyers for the same warke at grymley . . . xv. d.

Leaf 48.—Item, to William poole & a nothur mason for makyng of the chymney of the same warke . . . xviij. d.

Leaf 48.—Item, to Richard smyth for lokes with keys, catches for durres, with al other yerne warke to the seyde hows . . . x. s.

Leaf 48.—Item, to A dawber for warke at the seyde hows . . . viij. d.

Leaf 49.—Item, to Thomas kynges, peynter, for peynting of the seyde bordures . . . iij. d. a yearde . . . xj. s.

Leaf 51.—Item payd for brycke, lyme, & sonde, to the reparation of the Anckras hows by the charnel hows, ex deuocione . . . x. s.

Leaf 56.—Item, payd for the new schowryng & reparing of the Alabaster tabull to the hye Awter of grymley church . . . iij. s. vj. d.

Leaf 58.—Item, for a mⁱ of bryckes to mastur brewton, of gyft to his chymney at Nethurton . . . v. s.

Leaf 70.—Item, payd to thomas kynges for peynting of the bordures of my chamber & the deyse at crowle conteynyng xliij yeardes, pence of every yearde iij. d. . . Summa vij. s. viij. d.

Leaf 70.—Item, to Robert perryss, kervar, for the makyng of our lady & seynt John the euangelist, ix. s. apiece. Summa of the hoole, iij. li. v. s.

Leaf 75.—Item, payd to Edmund glassyar, of Alctur, for glassyng the lower wyndowe with mary & John in the chappell at crowle conteynyng ix footes & half pence . . . iij. s. xij. d.

Leaf 82.—Item, to A man for drawing of a platt for A stonne from London that is leyde before Jhesu's awter for me to be beride vndur, whiche stone cost x. li. to a man of london besydes the carage & the makyng of the platt iij. s. iij. d.

Leaf 85.—Item, to the seyde glassyer [cornesse colfull] for glassyng of the wyndow in the seyde chambur, on the yest parte to the lordes garden, conteynyng xxxij footes: of that ther is v skociens & vij Rowndes abate; the price of every skocien, viij. d.; the price of every rounde, vj. d.; the price of every foote of white glasse, v. d. conteynyng xxiiij footes: the v skociens & vij Rowndes conteyneth vij footes. Summa of the hoole is xvj. s. x. d.

Leaf 103.—Item, payd for c footes of glasse in quarrelles bowht at London, iij. d. ob. the foote, pence . . . xx. s. x. d.

Leaf 104.—Item, bought at london the peynted clothes that hangth in the lowe newe parlour next the chappell at batnall, conteynyng in length xxiiij yeardes & ij yeardes ij quarters depe, at v. d. ob. the yearde . . . lxvi yeardes of folery workes with dyuers beestes & falles . . . xxx. s. iij. d.

Leaf 105.—Item, for xij skociens of my Armes to A glaseare of Abbottes Bromley . . . viij. s. iij. d.

Leaf 114.—Item, for a framyng sawe . . . xx. s.

Leaf 114.—Item, for dressing of my clocke, to A Smythe, of glowcester . . . iij. s. iij. d.

Leaf 117.—Item, to thomas walsall & francis chamburlen for fallinge of trees for makyng pales . . . xxij. s.

Leaf 117.—Item, to thomas walsall & francis chamburlen for sawyng for pales at halow parke . . . xliij. s.

Leaf 117.—Item, to thomas walsall & francis chamburlen for clyving of pales for halow parke . . . xvij. s.

Leaf 118.—Item, to thomas walsall & chamburlen for paylyng at halow parke . . . xliij. s.

Leaf 127.—Item, to mastur . . . barnes f. peynting of the story on the chaptur howe . . . xliij. s.

Leaf 127.—Item, paid for xic of pales for the paylyng of halow parke, with the carage xliij. s. iij. d.

Leaf 127.—Item, paid for xv rayles to the paylyng . . . xvij. s.

Leaf 137.—Item, to thomas walsall & John wyrran, wurkyng at halow parke, in reparation of palym . . . iij. s. xij. d.

Leaf 133.—Item, to ij workemen for cropping & clyffing of wood at halow parke . . . v. s. viij. d.

Leaf 133.—Item, paid for v c pales at bewdeley . . . xx. s.

Leaf 133.—Item, for a c of pales & a half . . . vj. s. v. d.

Leaf 133.—Item, for a c of pale . . . iij. s. iij. d.

Leaf 135.—Item, to ij workemen for wurkyng & make the heed of the heed at crowle mott . . . vj. s.

Leaf 135.—Item, to laborers abowte the makyng of the heed stancke* at the mott at crowle . . . viij. s.

Leaf 137.—Item, to thomas childe for caryyng Rayles from monckewood to batnall parke . . . iij. s. j.

Leaf 137.—Item, for carage of an awter stone & crowle chappell from ombursleyt . . . x. s.

Leaf 137.—Item I sett to taske warke to John Gysse & Nicholas Symondes . . . crowle, the f. makyng of the on syde of the motte, on the . . . syde, by the pygion howse, to be Above xij footes in the . . . & xxxiiij footes in the ouer parte, and they to haue in the hoole . . . said warke, iij. li. xvij. d. paid ther-of, iij. s. iij. d. xl. s. x. s. viij. d. xliij. d. Summa, xliij. s. iij. d.

Leaf 138.—Item, I sett to taske warke, f. fynnyshyng of the hoole warke of the mott at Crowle on the North syde, to Anselme the baker, thome hays of crowle, conteynyng xij footes & more in the bootum, & xxxij footes Above at the ouer brymen more; & he to haue for his labour xxvj. s. viij. d. paid ther-of . . . xliij. s. xliij. s.

Leaf 140.—Item, payd to workemen for the makyng of A nowe well in the hye wey, in the hyther, or south wey of grymley towne, to serve the iij houselodes at that yend of the towne k. Richard pere howse, whiche well was made by William more, priur of wurceter, this wycke, whel was never well there before . . . iij. s. vj. d.

Leaf 154.—Item, to workemen for mendyng the fudyeates at grymley pooles

Leaf 156.—Item, to dyuers at grymley, f. . . .

* The next item, evidently immediately after the completion of the father's house, refers to the expense of his burial at Grymley.

† Several entries give v. d. a foot for white glass.

* Stanc, sb., O. Fr. estanc; pool, tank, reservoir.

† We know the approximate weight of the burden, to measure top slab of the altar, the distance would be about seven miles.

‡ The Prior's arithmetic is not to be relied on.

gathering of * peopul stones in the fylde of gryndale
for the making of more brugge And monckewodes
yeat vj s. viij d. xviij d.

**TRIER'S DOUBLE-ACTION STONE-
DRESSING MACHINE.**

MESSRS. BRUNTON & TRIER have recently brought out a new type of double-action stone-dressing machine, which is worthy of attention. The firm has produced several machines of a similar nature, but this they state is an improvement on all that have preceded it. Its leading characteristic is that it dresses two adjacent surfaces at one time, producing a perfectly sharp arris where the surfaces meet. The tool marks are also at right angles to the length of the stone and their number can be varied at will. Our illustration on the present page is a perspective view of the machine. The stone to be worked is attached to the table marked T in the illustration. This table is traversed by means of worm gearing placed beneath it, as shown at W in the illustration. Arrangements are made for running one table off the bed on to rollers, so that another can be substituted for it. In this way the stone to be dressed can be changed without the machine being thrown out of work whilst setting is being done. Revolving circular cutters are used, as shown at X and Y. The right-hand standard A is provided with vertical guides as shown. Upon this moves a compound slide rest having a vertical motion, which is imparted by a connecting rod, E, which is attached to the disc crank, F. This mechanism operates on the vertical sides. For the top or horizontal surfaces a tool-box is provided on the bridge or cross-beam marked C.

On this there are guides in which moves a compound slide-rest marked G; the direction being naturally horizontal. The connecting rod, I, is actuated by another crank, H. Spur wheels, K K, partly shown at the back of the crank disc, E F, by means of a pinion impart motion to both cranks, and to their respective slide cutters, by means of a belt, and fast and loose pulleys, L, on the pinion shaft. The motion is so timed that the cutters, although reciprocating together, and dressing the top and side surfaces of the stone at the same time do not strike each other. As will be seen, the length of stroke of the cutters can be altered by shifting the crank-pins in the slots in their discs. The cutters can be set to the required depth, and they act by the wedge action of their rolling sharp edges. In order to "step-cut," which involves acting on the stone at two different levels, during alternate strokes of the cutters, an arrangement is adopted by means of which the operation is performed automatically. Rods M and N which pass through slots in the brackets O P, are fitted with adjustable stops, and actuate a swivelling arrangement in the tool-holders at the end of each stroke. In this way it is arranged that when the cutter travels in one direction a deep roughing cut is taken; whilst on the return stroke the cut is a lighter finishing one. The stone is fed or moved forward at the end of each stroke when the cutters are off the stone. The amount of feed of the table is adjustable and determines the space between the tool marks. The speed of operation naturally differs with various stones and the class of work required; the makers give as an average the following rates of working:—On hard granite the advance averages 1 in. per minute, and on hard sandstone it can be increased to 4 in. per minute, giving an output on a stone 1 ft. by 2 ft. by 5 ft. of about 4 superficial feet of granite, and 15 superficial feet of sandstone in fifteen minutes. This does not take account of the time of changing stones, cutters, &c. With regard to the output per day, that naturally depends on the rapidity with which stones are fixed on the tables and the condition of the surfaces to be operated upon. The stones should be quarry-scabbled, and then cut 3 in. to 4 in. in depth will leave good surfaces. The wear of cutters is said to be very small; the tool cost being considerably less than that attendant on hand-labour. With most kinds of stone a smith is not required, the sharpening of the cutters being accomplished by grinding only. The power taken to drive the machines is also said to be very moderate, varying between 3 to 6 h.p. Messrs. Brunton & Trier make three sizes of these machines, of dress blocks of the following dimensions:—(1) 2 in. by 18 in. by 6 ft.; (2) 24 in. by 36 in. by 6 ft.; (3) 36 in. by 48 in. by 12 ft. There is no reason, however, why larger sizes should not be made. The machine can also be used for turning columns by winging them between centres fixed on the table and providing a simple means of rotating them. Amongst other purposes similar machines have been used for working the granite for the Tower Bridge, where they are stated to have given great satisfaction, both in surfacing on the flat and for turning and moulded work. The new machine illustrated above has been used upon the hard grit-stone of the new post-office at Leeds with great success.

THE BRITISH INSTITUTE OF PUBLIC HEALTH.
—We are asked to mention that the next examination for the Certificate of Proficiency for Sanitary Inspectors will take place on October 27 and 28. Candidates must send in their names before October 19.
* We may, perhaps, read this *o* as *by*, but the MS. distinctly gives *o*.



Some French Medieval Tiles.

**EXAMPLES OF FRENCH MEDIEVAL
TILES.**

THESE tiles are from a considerable collection of drawings of French Medieval tiles which have been made by M. Adolphe Guillon, a French landscape painter who is well known for his interest in archaeology and ancient monuments. M. Guillon has published a small book on the subject, giving the results of his studies with a number of illustrations.

THE CLUB AND INSTITUTE UNION.—In the presence of a numerous company of working men, Lord Brassey, who was accompanied by Lady Brassey, last week performed the ceremony of opening the new buildings of the Working Men's Club and Institute Union, which are situated in the Clerkenwell-road, Holborn. Mr. Hodgson Pratt presided. Lord Brassey said it was the boast of the men who formed the Union that they were working the movement by their own labour, and by the hold of that marvellous power of organisation which was so distinctive and notable a characteristic of the Anglo-Saxon race. One of the things which all men were anxious for was the multiplication of opportunities for bringing all classes of the people together. When the men of the Union secured an eight-hours' day they would be in a better position to enjoy the advantages which the building offered for recreation and instruction. On the motion of Mr. S. Taylor, a vote of thanks to Lord and Lady Brassey was carried amid cheers. The total cost of the premises was 20,000.

COMPETITIONS.

UNION CHURCH, CLYDEBANK, N.B. Owing to the present church of the Clydebank Union Congregation having been acquired by the railway company for the extension of the line, the erection of a new church upon an adjoining site was decided upon, and a competition invited for the purpose of selecting plans. Designs were requested from seven of the leading Glasgow architects, with Mr. Hippolyte J. Blanc, A.R.S.A., as assessor, and, in accordance with his award, the work has been placed in the hands of Mr. John B. Wilson, A.R.I.B.A., Glasgow; a second premium of 20*l.* awarded to Mr. J. Miller, and a third of 10*l.* to Mr. Wm. Rowan, both of Glasgow. Mr. Blanc, in his report upon the selected design, states:—"Design No. 5 is the only one whose cost is confirmed by the measurer's calculations at 5,500*l.*, and of all the designs submitted it is the most satisfactory on all points. The plan makes ample provision for the respective requirements, and the external design is complete. It expresses much individuality and refinement, and would, in my opinion, prove in every respect a most satisfactory edifice. I therefore recommend its adoption." The work is to be commenced as early as possible, with a view to completion in course of next summer.

HAMMERSMITH MUNICIPAL OFFICES.—At a meeting of the Hammersmith Vestry, held on Wednesday evening, a long discussion took place upon a series of recommendations by the Town Hall Committee, who had been instructed to

communicate with seven architects for plans and designs for the erection of a new Town Hall and Municipal Offices; but before doing this, the committee considered it necessary to recommend the Vestry to appoint an assessor, and also to settle the remuneration to be paid to the assessor and the competing architects. The recommendations of the Committee were as follows:—(a) That the Council of the Royal Institute of British Architects be asked to submit three names for the Vestry to select an assessor, (b) That the remuneration to the assessor be 100 guineas. (c) That the remuneration to each of the competing architects be 30 guineas, and 50 guineas to the author of the selected design, the Vestry not binding itself to carry out any of the designs. The Committee had also selected the following seven gentlemen (out of twenty-seven nominations) who were willing to send in competitive designs for the new Hall:—Mr. T. Garrett, Shepherd's Bush; Mr. H. Gough, Hammer-smith; Messrs. Isaacs & Florence, Raymond Buildings; Mr. E. W. Mountford, Strand; Mr. W. G. Perkins, Shepherd's Bush; Mr. P. P. Pugin, Brook Green; Mr. J. H. Richardson, Shepherd's Bush; and they submitted these names for consideration by the Vestry. Mr. R. P. Edwards proposed a series of amendments, the first of which was a proposal to substitute the names of Mr. Aston Webb, Mr. Bryden, and Mr. Ingress Bell for those of Messrs. Garrett, Perkins, and Richardson. The second amendment was that the sums of 100 guineas, 60 guineas, and 40 guineas should be awarded respectively as premiums for the three best designs. Thirdly he proposed that the assessor should be absolutely nominated by the President of the Royal Institute of British Architects. All these amendments were discussed at length, and finally the original recommendations of the Committee was agreed to, with the addition that the premium paid for the accepted design should be deducted from the commission on the structure. We regret this latter decision very much. The Vestry were acting more fairly by the architects in the first instance. The premium is little enough return for making the competition drawings, which can scarcely ever be available as working drawings, so that the whole thing has to be done over again.

Illustrations.

LIBRARY, WELBECK ABBEY.

THE new Library at Welbeck Abbey, which forms the subject of one of our illustrations, is being fitted up in one half of the old Riding School; the other half has been taken up by the new Private Chapel.

The view shows the proposed ingle-nook and screens dividing the room into two lengths for greater convenience of use.

The work will be in alabaster, with ebony screens, veneered with ivory and pearl, and decorated with work in coloured gesso. The fireplace of alabaster, with pearl inlay, is being made by Mr. F. W. Pomeroy.

The ceiling will be of modelled plaster, and the whole room will be panelled. At the end next the Chapel is the organ gallery, for an organ which is arranged to play into both the Chapel and the Library, and will have in addition an echo organ in the Chapel.

Mr. H. Wilson is the architect. The drawing from which the illustration is taken was hung in the last Royal Academy Exhibition.

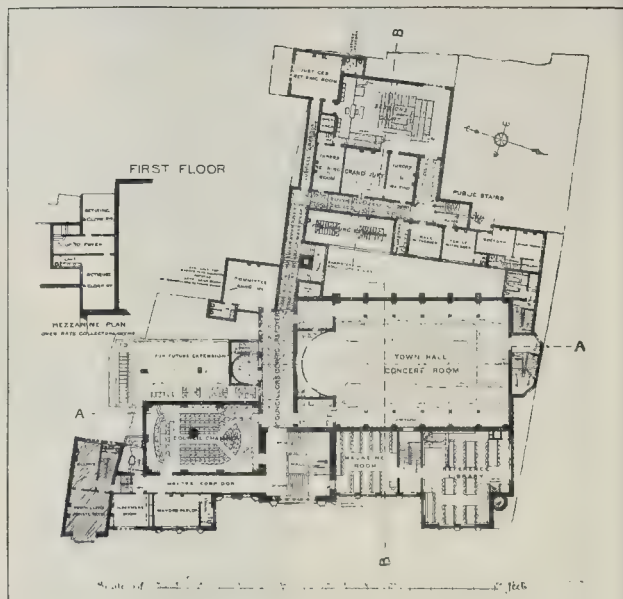
OXFORD MUNICIPAL BUILDINGS.

THIS design was placed second in the final competition. The assessor in his report considered "the general idea of the architectural treatment was decidedly superior to" the accepted design, but the detail was not considered by him so satisfactory.

The materials proposed to be used were:—Monks Park and Box-ground Bath stone for external walling; the roofs to be covered with Westmoreland green slates.

A feature in the design was the setting back of the central portion, which was rendered desirable on account of the narrowness of St. Aldate's street.

Particular attention was given to the disposition of the windows and openings in the rear of the building, in view of the probability of other buildings being erected on the rear boundaries; and it will be seen that the plan has been greatly governed by the important element of lighting.



Second Premiated Design for Oxford Municipal Buildings. Plans.

We may add that the original water-colour drawing, an exceptionally good one (as we observed in reviewing the architectural drawings at the Royal Academy), is by the architect's own hand.

SCULPTURE FROM THE ROYAL ACADEMY EXHIBITION.

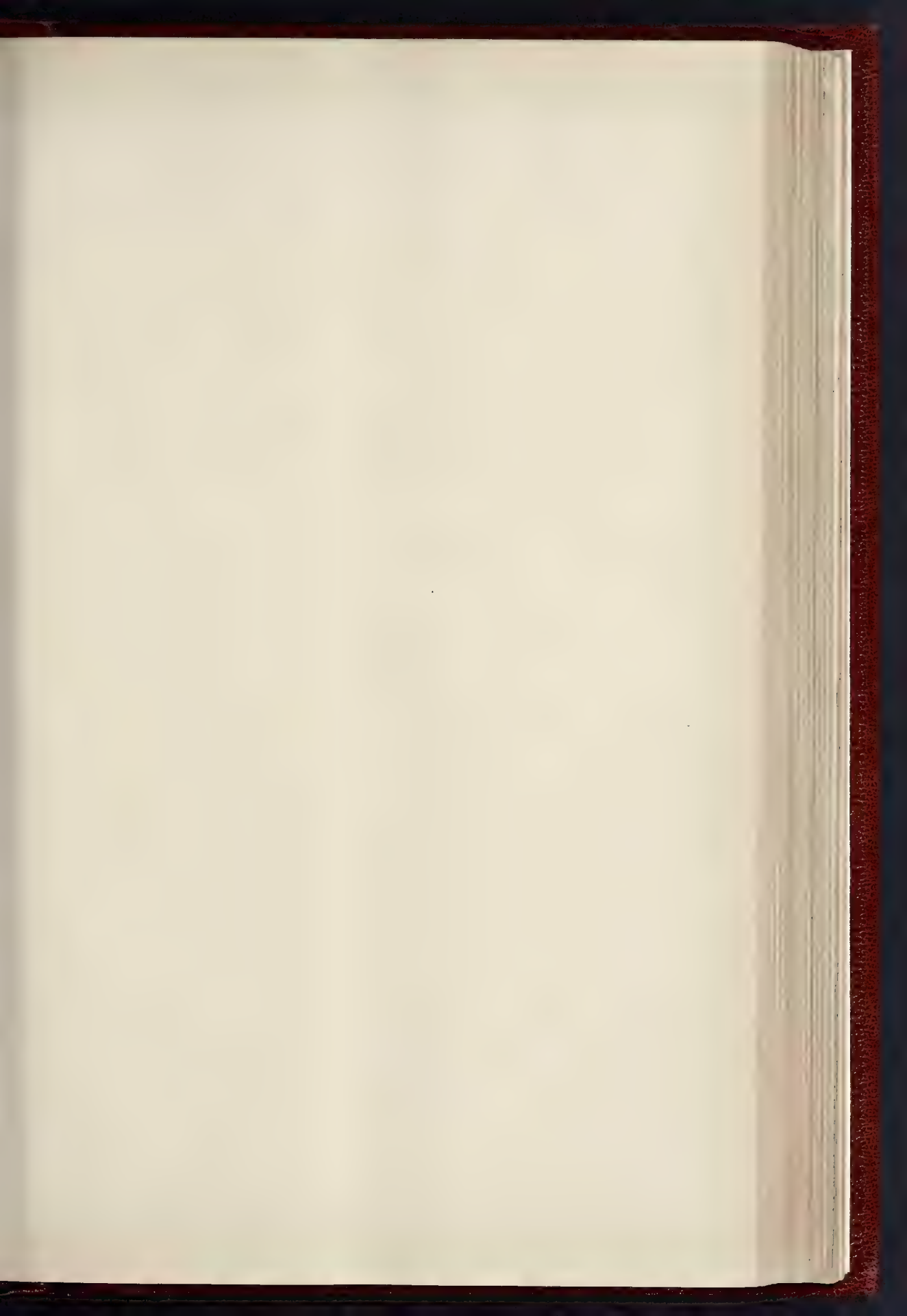
"MYSTERIARCH."

THE bust thus entitled, the work of Mr. G. Frampton, occupied a central position on the south wall of the lecture-room at this year's Royal Academy Exhibition, where it attracted a good deal of attention. It is an attempt to express in the head and in the accessories the idea of one who presides over mystery, a kind of priestess such as might have given out the oracular message at

Dodona. The face is dreamy and self-contained in expression, the wings and the drooping hair in which the head is framed serving to increase the effect of mystery, the expression of something weird and inexplicable. The mask and the bat wings on the bust subserve the same effect. The head is relieved in front of a surface partially gilt and broken up into curling lines of slight relief which forms a kind of nimbus behind the head, the broken up surface preventing the effect from being too hard and pronounced, while it symbolises the smoke which always accompanies the utterances of the oracle. The architectural accessories are well treated, and the work altogether is one of unusual interest, both in idea and design. It is executed in marble.

MEMORIAL TABLET.

The memorial tablet to Dr. Wooldridge, of

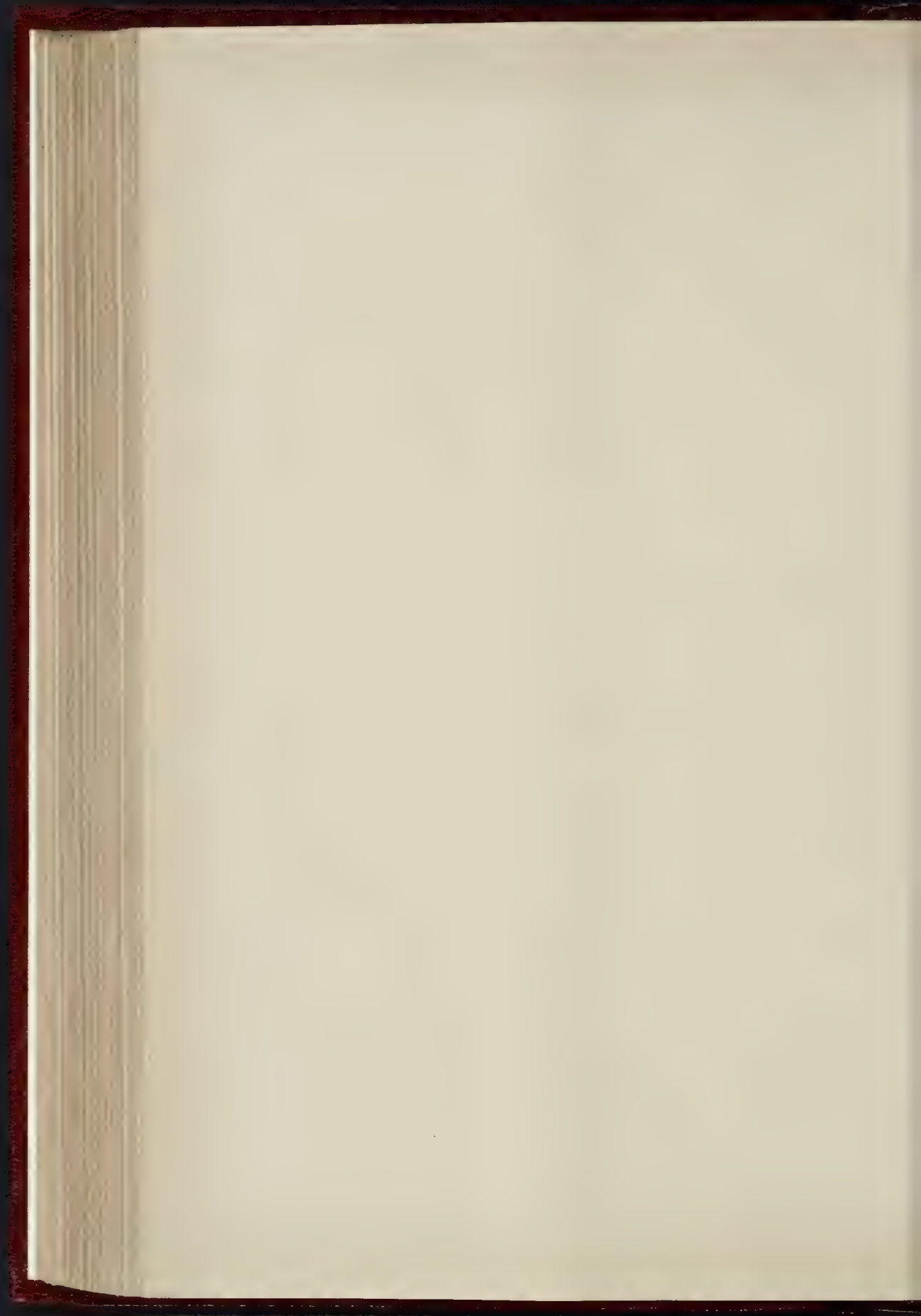


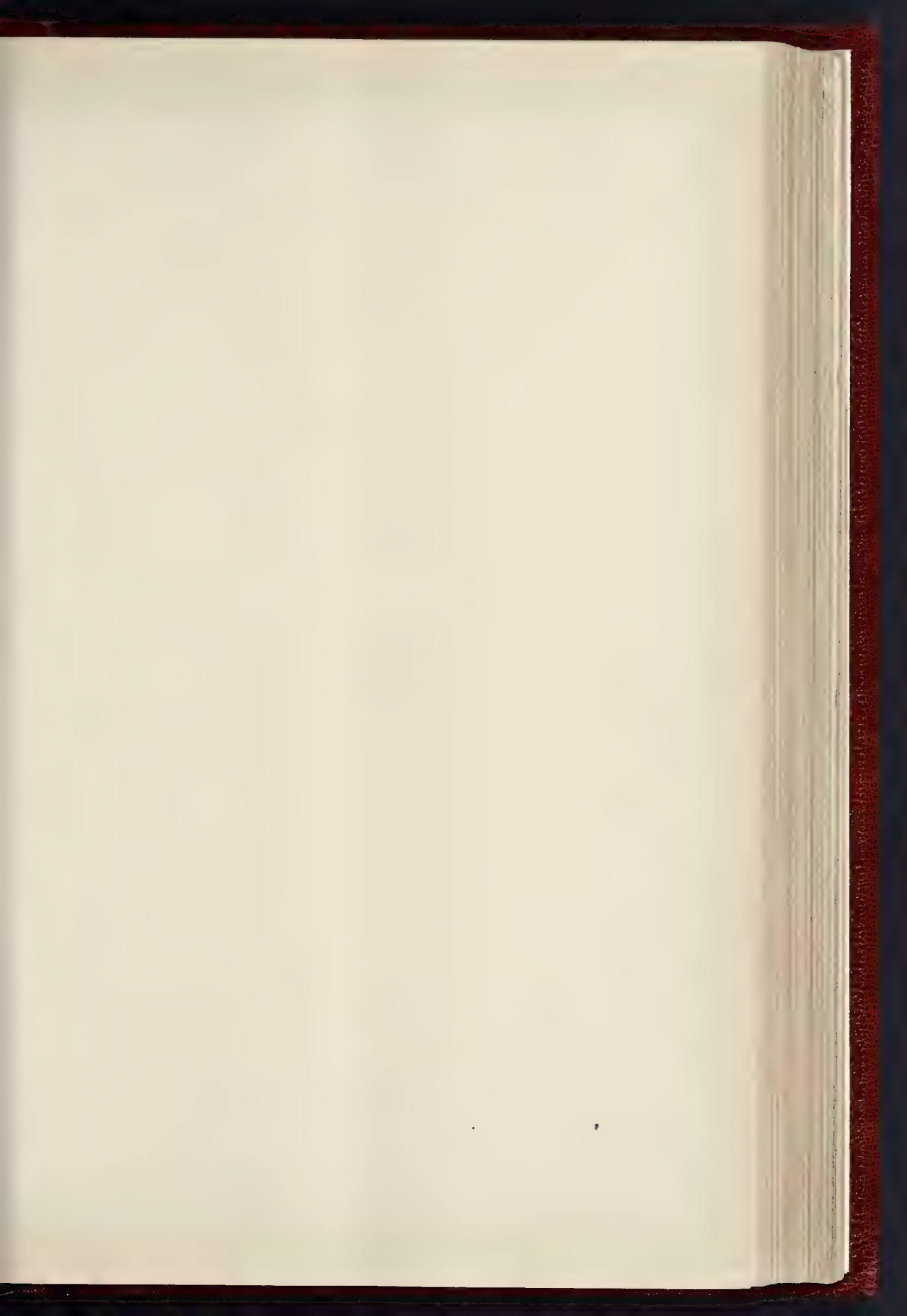


Royal Academy Exhibition, 1893

OXFORD MUNICIPAL BUILDINGS. SECOND FLOOR.

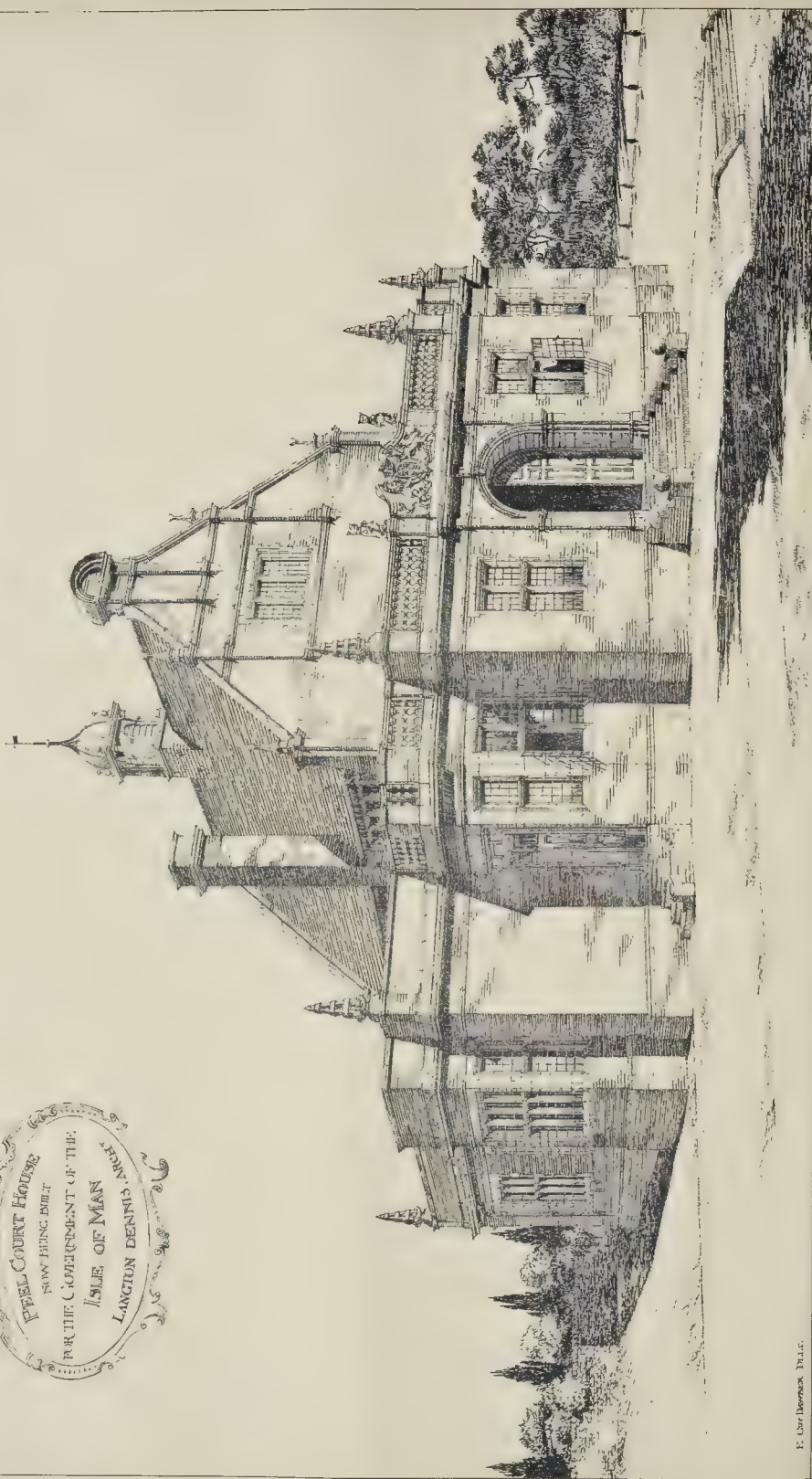
DESIGN MR ERNST RUNTZ, ARCHITECT

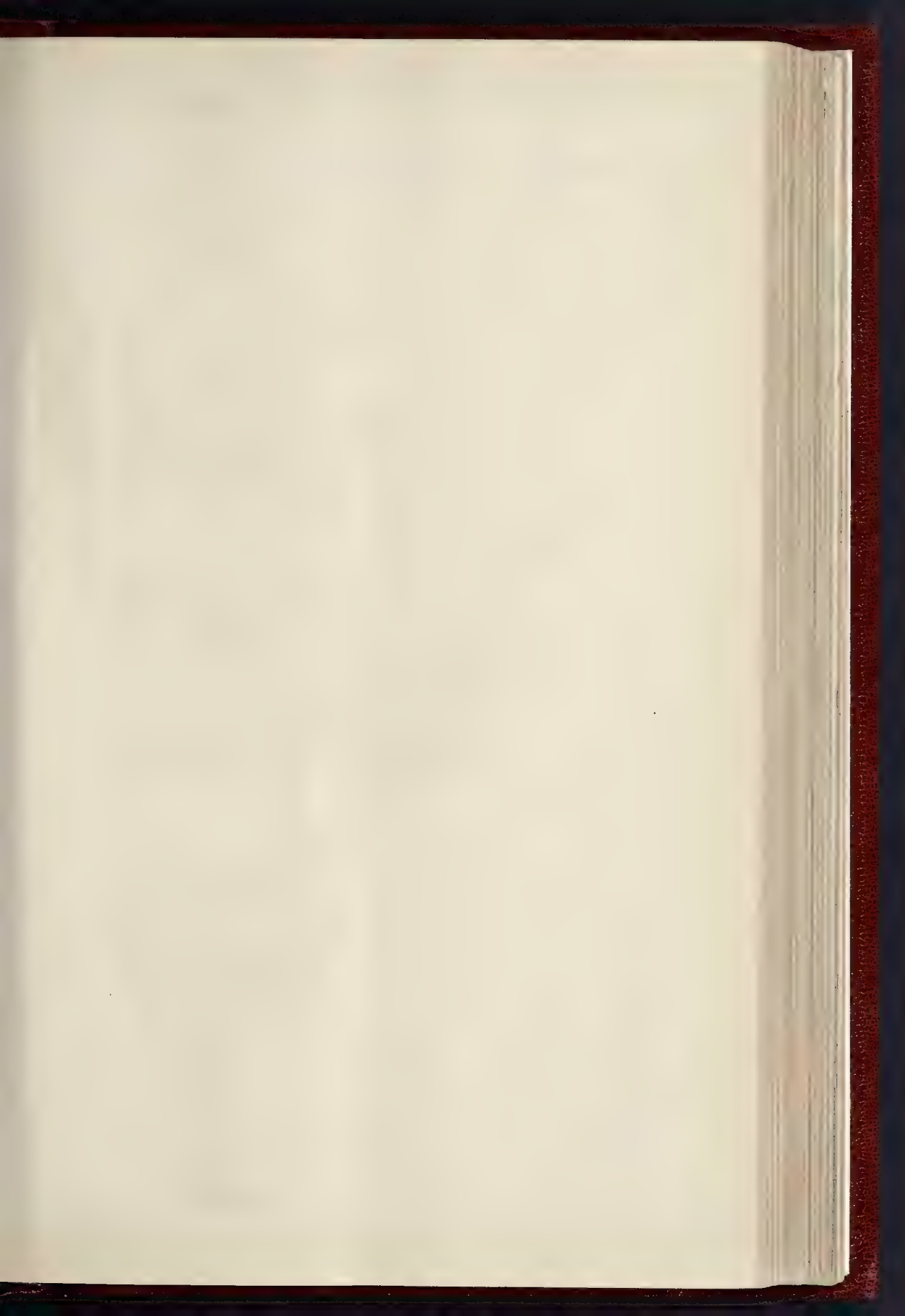




THE BUILDER, SEPTEMBER 23, 1893.

PEEL COURT HOUSE
NOW BEING BUILT
FOR THE GOVERNMENT OF THE
ISLE OF MAN
LANGTON DENNIS & SONS' ARCHT.







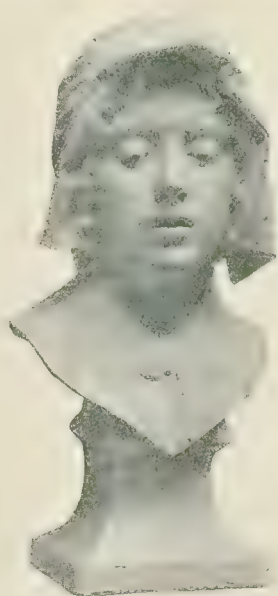
MYSTERIARCH MR. GEO. FRAMPTON SCULPTOR



A
MEMORIAL TABLE
TO
LEONARD CHARLES
WOOLDRIDGE, M.D.

MR E ROSCÖE MULLINS,
SCUPTOR

ROYAL ACAD. DE LAS CIENCIAS
1893



B.
BUST
WITH MODEST EYES
DOWNCAST

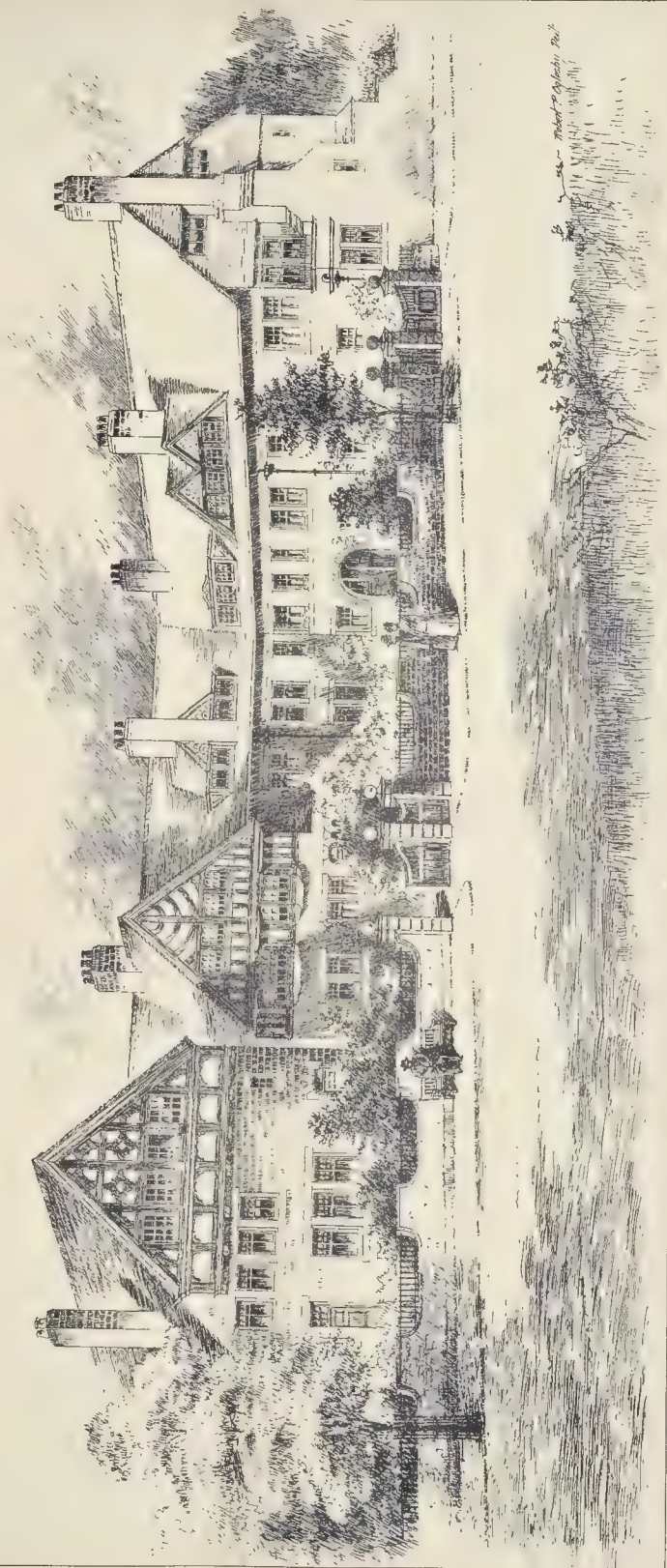
MR. A. C. LUCCHESI,
SCULPTOR

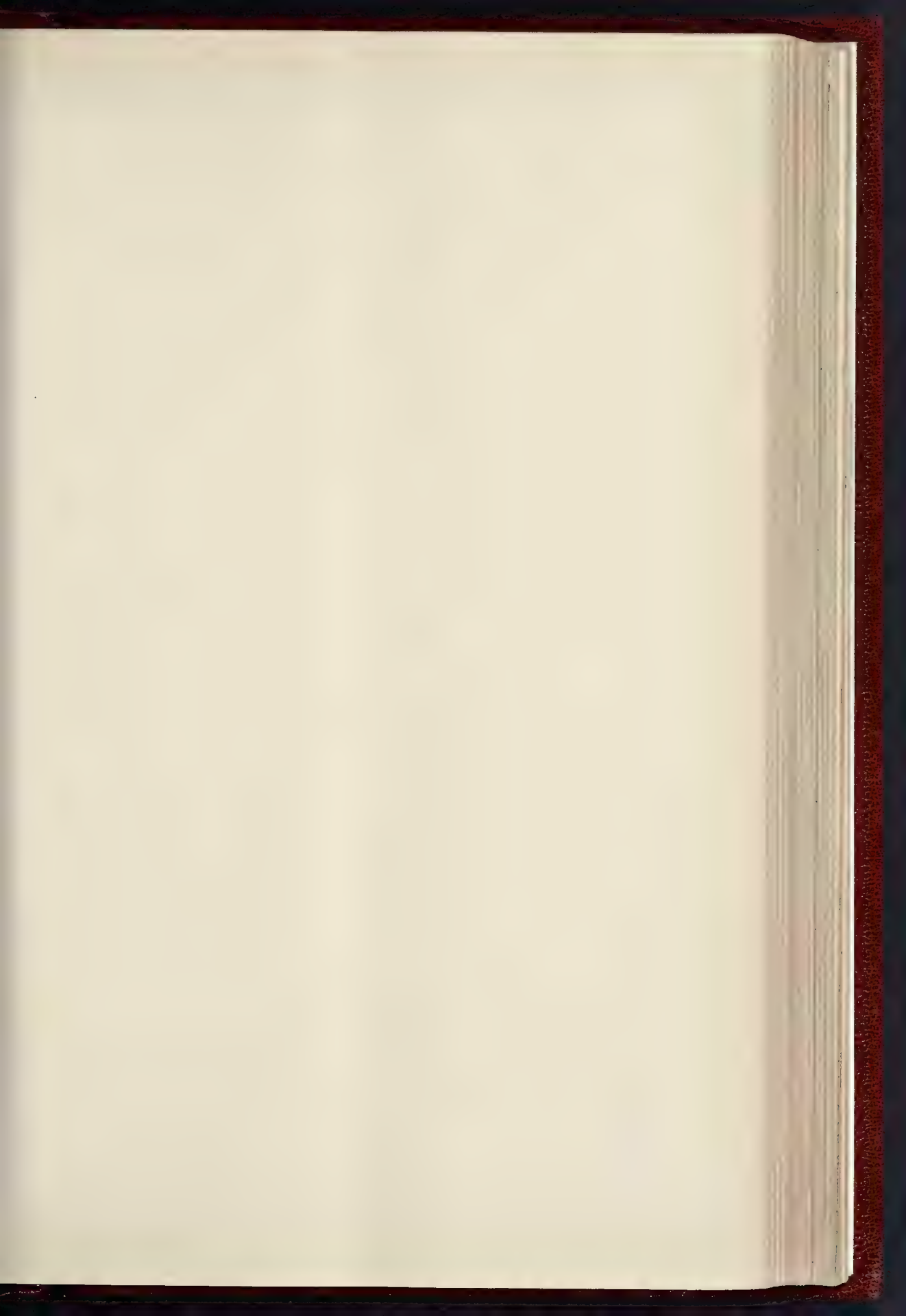
How a Army Exhibition
1896

The Grove, Harrogate.

for *Saunson Fox Esq.*

T. Butler Wilson. Archt.

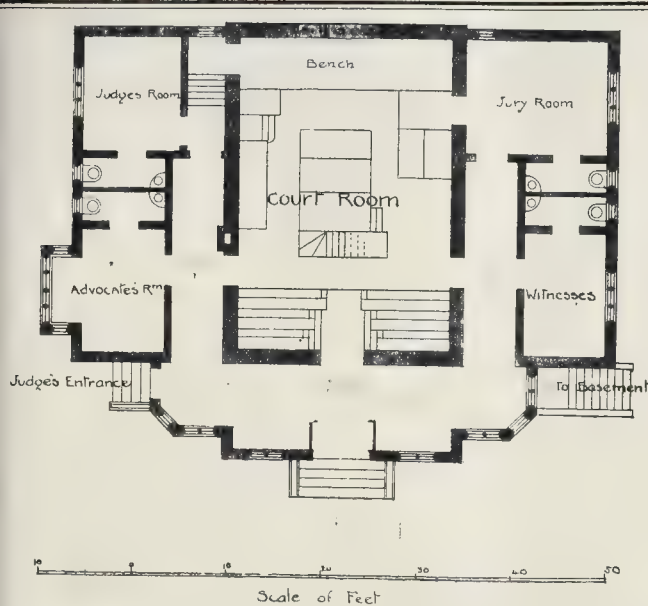








REY—MR. H. WILSON, ARCHITECT



a kind of concise guide to the literature of architecture.

In the concluding paragraph of his preface the author observes that no doubt much remains to be discovered from unpublished inscriptions remaining on the buildings themselves. Beyond this, until the British Museum contains all the local histories published, and until these have been thoroughly examined, a great deal of information must remain to be acquired, and a work of this character must still be incomplete; "but the author has considered it better to issue these tables at once, whatever their omissions or imperfections may be, rather than indefinitely to wait for an almost impossible completeness." Mr. Perry is quite right. Life is short, and in a work of this kind, in regard to which there must be always something new to be learned, it would have been quite a mistake to hold back the large amount of information which he has already put together, in the expectation of eventually gaining more and reaching a point from which there would still be a vista in advance, of possible further information.

As we have implied, such a book cannot be regarded as a work of literary interest in the ordinary sense of the word; its real interest depends very much on the mind of the student who comes to it, and on his perception of its practical value in aiding our historic conception of architecture. On the other hand, the book enjoys the fortunate position of being one to which criticism can hardly be applied. In clear and systematic arrangement it seems to be as well done as it possibly could be; it is a kind of work for which one can offer nothing but thanks and commendation, and which must henceforth be a necessary appendage to every architectural library. We hope it will receive that practical recognition from every student and professor of architecture which the author will probably feel to be the best reward he can have for his painstaking and intelligent labour.

Books.

The Chronology of Mediæval and Renaissance Architecture: a Date-book of Architectural Art, from the building of the Ancient Basilica of St. Peter's at Rome to the Consecration of the present Church. By J. TAVERNOR PERRY, Member of the Royal Institute of British Architects. London: John Murray. 1893.

IN this book, the result of much research, Mr. Tavernor Perry has done a new and most useful piece of work, of the highest value to architectural students. As he observes, no writer has yet attempted to present in sequent and chronological order an account of works simultaneously in progress in different countries. The author commenced the compiling of these tables for his own purposes, and the sense of the value they have had for himself has induced him to make them available for the use of others. Architectural students owe him their best thanks for undertaking a tedious and laborious piece of work, the result of which, however useful, is not of that kind which brings with it popular success with general readers. The number of those who will use and appreciate such a book is necessarily limited; but it is a publication which appeals especially to the most serious and thoughtful class of architectural students.

The book opens with a short synoptical table of the leading buildings in Europe erected during certain divisions of historical time. Then follows the serious business of the book, in the shape of architectural events arranged in chronological order, as nearly as possible year after year. In the early part of the chronology we have, naturally, gaps of several years between the buildings that can be dated and recorded; as we come nearer to the Mediæval period, when there is more information available, the dates become closer, and after the year 1000 we proceed by consecutive years, the lists for each year gradually increasing in length, down to the year 1626, which closes with "St. Peter dedicated by Urban VIII., November 18th."

The second part of the book consists of an alphabetical index to the places and buildings mentioned in Part I., the dates of the years under which each has been mentioned being appended to the name of the building. A third part gives an alphabetical list of the names of architects, sculptors, and other persons referred to in Part I., dated in the same manner as the buildings in Part II. The volume is concluded with a fourth part, giving an alphabetical list of the principal authorities quoted in the book, which is in itself

A Handbook of Ornament, Systematically Arranged, for the Use of Architects, Decorators, Handicraftsmen, and all Classes of Art Students. By FRANZ SALES MEYER, Professor at the School of Industrial Art, Karlsruhe. Translated from the fourth revised German edition. London: B. T. Batsford. 1893.

WE are quite unable to understand the motive for translating into English and republishing in this country works on ornament by German writers. In England at the present day we are so far beyond the Germans in taste and perception, as well as in the practical designing of ornament, that it is certainly the Germans who ought to translate and study our books instead of our being invited to study theirs. For the mere literary study of the subject, no doubt, Herr Meyer's book is useful. It is a very extended and elaborate analysis of the history of ornament, and of the various classes of forms and subjects which have been used ornamentally at various periods, and the author sets out rightly in making the study of geometrical forms and arrangements the basis of the study of ornament. All this, however, is admirably put in Mr. Day's series of books on ornament, and Owen Jones's monumental work; we do not require to go to Germany to learn it. And in this, as in other German books we have seen, whatever is valuable in the text is more than compensated by the bad character of the illustrations, which can have no effect but to vitiate the taste of the beginner, while the ornamental designer who knows anything of his art as it is understood in England will only regard them with contempt. The greater proportion of the examples given are in the poorest taste; many of them have no claim to be called ornament at all, and even those which are good in themselves are spoiled by the hard, wiry, inartistic style of drawing employed. Of the German ornamentist it might be said, in a kind of dog-Latin variation of a well-worn saying, *nil teligit quod non spoliavit*. The Renaissance ornament is the best drawn, and even that has all the delicacy and spirit taken out of it; the Gothic ornament is reduced to Batty Langleyism, and the characteristic Greek forms of ornament seem to have lost their proper flow and look as if they were done in cast-iron.

The student may find this useful as a book of reference for styles and history, but the less he looks at the illustrations the better—and surely exactly the contrary ought to be the case with a book on ornament that is to be worth anything. The text ought to teach him the right principle of treatment, but the illustrations should be a still better instruction, as in the best English books they are, and as they are not in this or any

which we give an illustration, is the work of Mr. E. Roscoe Mullins, and was exhibited at the Royal Academy of this year. The sculptor was left entirely free to adopt his own treatment, and the result is a design which is remarkably decorative in its lines, and fills the circular space in a natural and unforced manner.

The tablet is executed in bronze, and has now been placed in the vestibule of the museum of Guy's Hospital.

BUST: "WITH MODEST EYES DOWNCAST."
The above words formed the only title to this bust in the Royal Academy catalogue. It is the work of Mr. Andrea C. Lucchesi, who intended it as illustrative of modesty; the costume is Puritan, in order to harmonise with the idea of the work. It is executed in marble, and was one of the most pleasing and interesting of the busts in the Exhibition.

COURT HOUSE, PEEL, ISLE OF MAN.

THIS Court-house, which has lately been completed, is faced with red bricks and pink terracotta, from the works of Mr. J. C. Edwards, of Ruabon. Small green slates, from the Llwydcoed quarry, Penygroes, have been used for the roofs. In the basement are arranged two cells, and an officers' room as well as a heating chamber and coal-cellar.

The builders were Messrs. McAdam & Moore, of Douglas. Mr. Langton Dennis was the architect.

"THE GROVE," HARROGATE.

THIS, as will be seen by the plan, is a collection of cottages built round three sides of a quadrangle, the open end of the quadrangle facing the entrances of the client for whom the cottages were built.

The materials used are local sandstone, timber, and red tiles.

The architect is Mr. T. Butler Wilson.

"COURTYARD OF HOUSE AND STUDIO."—Mr. Howard Ince, the architect of this house, which we illustrated last week, wishes us to add that the house is No. 16, Maida Vale, and has been built for Mr. Alfred Gilbert, R.A.

THE THREATENED LOCK-OUT AT CARDIFF.—The master builders of Cardiff, who had threatened to lock-out the union masons in their employ owing to the refusal of the men to work with their non-society men, have come to terms with their employers, and work has been resumed, the non-society men joining the union.

modern German book of the kind that we have seen. Then why go out of the way to introduce them to English readers who have better guides at their own doors?

Sefton: a Descriptive and Historical Account. By W. D. CAROE, M.A., F.R.I.B.A., and E. J. A. GORDON. London: Longmans & Co. 1893.

THIS is a handsome and well-illustrated book of the local history of Sefton or Septon (the latter the old spelling) near Liverpool, embodying the collected notes and researches of the late Rev. Engelbert Horley, a member of the Historic Society of Lancashire and Cheshire. The church of Sefton, though not very striking in its exterior, is a very interesting one, and contains effigies, brasses and carved woodwork of which illustrations are given; and the neighbourhood appears to furnish a good many quaint and picturesque bits of old building. We presume the illustrations are by Mr. Caroe.

It appears that Sefton church is still unrestored, and the authors express a hope, in which we coincide, that it may be left as a rare example of an unrestored Medieval church, except so far as the removal of some inconvenient additions made in the churchwarden era may be desirable. As far as the stability of the fabric is concerned we are assured that Sefton church is in a perfectly safe and satisfactory condition.

The interest of the book is to a great extent local, but it is a very well got-up volume of its class, and may as such deserve a place in the libraries of archaeologists beyond the limits of the locality of which it treats.

Les Artistes Versaillais. Les Moreau. Par ADRIEN MOUREAU. *Les Cochin.* Par S. ROCHEBLAVE. Paris: Pierson et Cie.

How many readers in this country know anything of "Les Moreau?" We confess that the name was new to us. The two Moreaus, brothers, were painters of the latter half of the last century, living just into the present one; the elder, Louis Moreau, a landscape painter, the younger, known as Moreau le Jeune, a figure-painter chiefly of society scenes, and by far the more important artist of the two; many of his groups and studies of single figures are charming in a certain conventional and affected manner of the period; the studies of costume figures (except in a tendency to make the heads too small, which is sometimes carried to an absurd excess), show admirable drawing and keen observation of manner and character. Moreau was employed, or employed himself, not unfrequently in commemorating important scenes in connexion with the French monarchy; among others we have in this volume the reproduction of his representation of the illuminations at Versailles on the occasion of the marriage of Louis XVI., the opening of the States General at Versailles in 1789, &c. Many of his pictures have great interest as illustrations of the manner and dress of the society of his period. He made illustrations to the works of Rousseau and Voltaire, and one of the best designs given in the book is "Le Premier Baiser d'Amour," made as an illustration to Rousseau's "Nouvelle Héloïse." The numerous sketches and studies which illustrate the volume are taken from the large collection of original drawings by Moreau in the Louvre.

"Les Cochin" were a duet of artists who take a place very analogous to that occupied by the Moreaus. In this case as in the former, it is the junior of the name who is the more important and gifted artist, but with the Cochins the relationship was not that of elder and younger brother, but of father and son. Cochin père was an engraver, and eventually engraved some of his more gifted son's works. Cochin fils, who lived during the same period nearly as Moreau le Jeune, is somewhat similar to the latter in the nature of his work. He also produced prettily grouped and graceful illustrations of contemporary society, designed ornamental plates and borders, and painted representations of important functions at Versailles. He was also a noted portrait-painter, and engravings of many of his portraits are given here as illustrations. Cochin's studies of figures and groups of an imaginary kind are very numerous and varied, and in some respects superior to Moreau's; the style is more elevated. Both these books afford very interesting record and illustration of the works of some artists little known in England.

An Architect in Exile; and other Essays. By BERNARD WHELAN. London: Burns & Oates. New York, Cincinnati, Chicago: Benziger Brothers.

THE Architect, in Exile describes himself as

"banished to a quiet corner of Kent," whence he writes the first essay which gives the title to his small volume. The book consists of short essays on various subjects—"The Gothic Renaissance," "St. George for Sheffield" (a Ruskinian article), "The Oldest of the Arts," "The Physiognomy of Counties," &c. The writing is not in any way technical, the book is one of literary and general interest, and as such is a very pleasant one to read, containing many suggestive remarks put into picturesque language. The concluding chapter, on "The Glory of Height," is charming. The author's success, in a literary sense, in this small book, might very well encourage him to further literary efforts, as a diversion from the sterner duties of his calling. We may recommend the book to brethren of the craft.

TRADE CATALOGUES.

MR. JOHN JONES, Contractor and Patentee of Sanitary Specialties, sends us an illustrated catalogue showing his air-inflated bag for stopping pipes for water-testing; his air-tight man-hole covers, which provide ingeniously for utilising the condensed moisture from the sewer as a second seal, in addition to the seal formed by the seating-groove of the plate; and other special sanitary appliances.—Messrs. Edison & Swan send us their illustrated price-list of the "Ediswan" portable batteries.—Messrs. Spear & Jackson, of Sheffield, have issued a small illustrated catalogue of hand-saws in pamphlet form, which is prefaced by some practical recommendations as to the handling and sharpening of saws.—Messrs. Jas. Guthrie & Co. send a largely illustrated catalogue of lamps, gas fittings of all kinds, also gas stoves, &c.—Messrs. Roberts, Adlard, & Co. send a catalogue of ornamental slating and ridging, with some explanations as to the best means of setting and arranging slates for the formation of patterns or inscriptions. The latter, of course, are only of use to tradesmen; and architects do not much favour pattern-slating now; but it is convenient that those who want it should have the requisite practical information before them in regard to this class of work.—Messrs. G. B. Kent & Sons send us their illustrated catalogue of brushes, both for house-painter's and artist's work.—Messrs. W. Pryor & Co. send a very voluminous catalogue, including plumber's fittings, grates, kitcheners, mantelpieces, ornamental railing, &c. The ornamental work is no better than it usually is in such catalogues—the chimney-pieces rather worse than usual; but the practical fittings seem very good, and the prices low.—Messrs. Twyford's very well-got-up catalogue illustrates a great many excellent articles made by the Cliff Vale Pottery Company: the "Deluge" and "Deluge Admant" (extra strong) type of closets appear admirable; the "National" and "Alliance" side and front outlet closets are not good, because the depth of water in the pan is far too small, and if there are 100,000 in use we regret to learn it. There is rather too much display of ornamental work in the drawings of some of the closets and lavatories; it may be doubted whether this is an advantage even commercially; most sensible people nowadays prefer simple, well-made work to stock ornament.—Messrs. William Sugg & Co. send us their catalogue of patent ventilators, ventilating gaslights, &c., many of which have excellent practical qualities; it is a pity that the makers of these kind of things will try to produce what they call "ornamental" designs, such as those on pages 4 and 5. They can never recommend a catalogue to architects by such designs.—Messrs. Hartley & Sugden's catalogue of wrought iron and steel welded and riveted boilers is a useful and fully illustrated catalogue of practical work.—The Ashton & Green Iron Company send us an ample catalogue of fireplaces, enamelled plate goods, sanitary appliances, &c.—Messrs. Adams & Co. send a revised edition of their catalogue of sanitary appliances, in which large flushing-tanks form a special feature. The work and the illustrations are mostly excellent; we may observe, however, that a larger proportion of sectional drawings, instead of mere outside delineations, would make the catalogue more generally useful to architects, who want (or ought to want) to see exactly how a thing works, not how it looks. We may also observe that their turn-over inner rim for bath, which, as they say, prevents splashing, is a contrivance which was patented by the editor of this journal, and illustrated in these columns, some years ago; the patent, however, was allowed to lapse.—Messrs. Wood & Ivory

send us their illustrated catalogue of red and blue brick pavings, curbs, crestring, and finials, &c., of which the practical part seems very good; the designs for ornamental string-courses and crestring not all that they might be, though they include some useful patterns.

—Mr. W. F. Stanley, the well-known optician, sends a new catalogue of his excellent instruments of all kinds for draughtsmen's work.—Messrs. J. Bennett & Sons send us an illustrated catalogue of their casings and covers for electric light wires, which are ornamented by the new system of mechanical pattern working in wood, called "Goehring." This is a suitable application of such a system for the purpose of breaking up a plane surface by a running pattern.

Correspondence.

To the Editor of THE BUILDER.

CRACKING OF PORTLAND CEMENT.

SIR,—The extracts in your issue for last Saturday from Mr. Fajja's paper on Portland Cement, especially the paragraphs relating to the peculiarity of "blowing" and to cracking in cement work, are extremely interesting and important to both architects and contractors. That Portland Cement work does crack, when the only accountable reason is, the cement being bad or "blowey" is well known and constant, and as a source of annoyance to architects and of loss to contractors. But have we any experimental data proving that cracks may not be caused by expansion and contraction in the cement itself, even after it has finally set, due to a change of temperature?

For instance, the floor or walls of a bakehouse, exposed at times to great heat, or external rough casting, exposed to the sun's rays at certain seasons. I have a case or two in my mind in which cracks in the finished work could only be attributed to the cement being bad (of which there was no evidence, but rather the contrary), or that expansion and contraction, due to variation in temperature, was taking place in the material itself. This latter theory was strengthened because the cracks were more apparent at certain times than others.

J. H. MARTINDALE.

RE "LEICESTER STORM OUTFALLS."

SIR,—In your number of the 9th inst. you give a short description of the Leicester Outfall Culvert, and it is to this that I should like to add a few explanatory remarks.

Any one reading the description would come to the conclusion that cellar-flooding formerly took place in the whole town of Leicester, and that the new culvert was intended to free the whole town from this and its attendant evils. Allow me to point out to you that this is not so. Though Leicester is situated in the valley of the Soar, the land on either side rises quickly, reaching an altitude of 120 ft. on the right bank, and 120 ft. on the left above the level of the river at the Sewage Pumping Station. It cannot, therefore, be said that the town is built upon a level plain; and cellar flooding was confined to one, comparatively speaking, small, low-lying area on either side, and close to the river. It is for these two districts, in the first instance, that the new storm outfall is designed, but arrangements have, of course, been made, so as to utilise it for the whole of the town when necessary.

It is but natural that I should take a great interest in this matter, as it was my father, the late Mr. Joseph Gordon, who designed the whole of the Leicester Main Sewerage, and Sewage Disposal Works. He presented his first report on the Sewage Disposal Work on November 14, 1884, and on October 22, 1885, the Town Council agreed to purchase land for a sewage farm; the agreement with the owner of the land bears the date February 9, 1886.

In the same month he presented his report on the New Main Sewers for Leicester, which the Town Council sanctioned three months later, viz. May 25, 1886.

When my late father left Leicester on September 1, 1889, to take over his new appointment as Engineer-in-Chief to the London County Council, both the Main Sewerage and Sewage Disposal Works were well in hand. I should add here, however, that after his leaving Leicester, various alterations and deviations were made from his original ideas for which, I am sorry to say, the ratepayers have had to pay very heavily, without, so I am informed, obtaining any corresponding advantages for them. For the new main sewers the excess of the actual cost over the estimate was, down to March 25 of this year, about 9,000l., and for the outfalls about 24,000l., which sums together represent an excess of 25 per cent.

Both works are not yet completed, and the excess finally may be still greater. T. S. GORDON, Leicester.

SMOKE PREVENTION.

SIR.—I believe that some little time since demonstrations were given on the embankment of a process for washing the results of combustion as they entered the chimney, and that the unconsumed carbonate was intercepted, and nothing was seen but a little white vapour. I should be glad to learn, through your columns, whether this process has in work proved useful, and if so, where it may be seen in operation. SOMERS CLARKE.

The Student's Column.

GEOLOGY XIII.

THE NATURE AND USES OF METAMORPHIC ROCKS.

THE origin of metamorphic rocks has been sufficiently discussed in this column in a previous article. It is our present purpose only to define the structure, composition, and uses of different kinds of material falling into this division, in so far as they may be useful to the architect.

Marble.—Properly so-called is a true crystalline limestone—that is to say, it contains no definite traces of fossils, and, if these were ever present, they have been transformed into crystalline mineral matter together with the whole of the other constituents of the original rock. When pure it is white, and has a texture somewhat resembling that of loaf-sugar in outward appearance, from which circumstance it is not infrequently alluded to as “saccharoid marble.” As it has resulted from the metamorphism of limestone, its chemical composition is mainly carbonate of lime, though this will vary according to the presence of impurities of various kinds.

Fig. 1 shows the appearance in transmitted light, under the microscope, of a piece of white statuary from Carrara, which is an example of a typical marble. It may be described as an aggregate composed of crystalline calcite granules

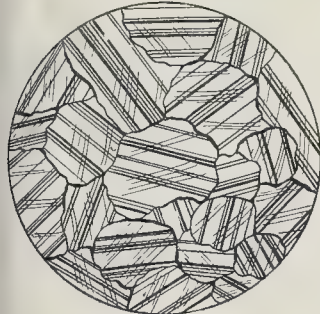


Fig. 1. Micro-Structure of Statuary Marble.

of tolerably uniform size, each of which possesses distinct lines of cleavage, and what are known as “twin lamellæ.” The student is requested to compare the micro-characters of this rock with those of the aqueous limestones depicted in Article XI.; the great difference in structure is at once observable. The texture of statuary marble varies considerably, and its quality is often determined by the sculptor from that standpoint alone. Its freedom from light blue veins, specks, &c., is not enough to gauge the value of marble for statuary purposes, as some seem to imagine, although, of course, it must be white to be of very excellent quality. The minute calcite granules are more brittle in some saccharoid marbles than in others, and the grain is not always even, characters of supreme importance in facilitating or retarding the sculptor's work, as the case may be, and its quality and finish also. Such variations in structure, although often difficult to detect without actually tooling the stone, are immediately apparent when studied under the microscope, and very little practice is required to enable the student to determine these points.

The so-called shell-marbles, Madrepore-marbles, crinoidal-marbles, &c., are not marbles in the true sense of the term, although in some instances the limestones constituting them have been partially metamorphosed, and the organic remains much altered.

In addition to forming the only material really suitable for statuary, the inferior kinds are polished and used for decorative purposes, their veinnings and divers fanciful patterns investing

them with a certain amount of interest. Good lime is often made from the odd blocks and pieces about the quarries.

Quartzite.—Metamorphosed sandstone; its chemical composition is almost pure silica, though the presence of impurities will naturally cause some slight variation. Under the microscope the original quartz grains (sand) are distinctly seen (fig. 2) enveloped by a matrix of silica, the whole being remarkably compact. The rock breaks with a conchoidal fracture. It is quite unfit for building purposes, being so intractable in the

with their longer axes running parallel with each other. The spaces between these lines or planes, it is easily conceived, are positions of weakness, and the rock may be split up along them in the direction indicated by the arrow. Such a structure is termed “slaty cleavage,” and from the manner of its origin is quite independent and has no connexion with planes of bedding of the original sedimentary material. The following diagram, representing a section across a tract of country wherein cleavage structure has been set up, serves to illustrate this point:—

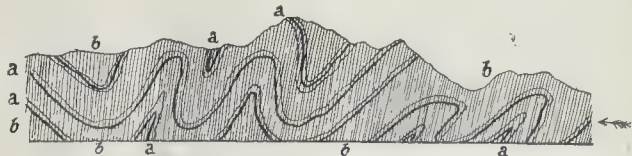


Fig. 4. Geological Section showing the Relations between Cleavage and Bedding.

a. Lines of bedding slightly contorted.

b. Cleavage planes, not contorted, fairly parallel with each other, produced by lateral pressure.

The arrow indicates the approximate direction of pressure.

hands of the mason. Nevertheless it is one of the most durable stones known, and is largely employed in some localities as road-metal. We cannot say that it makes an excellent road-stone,

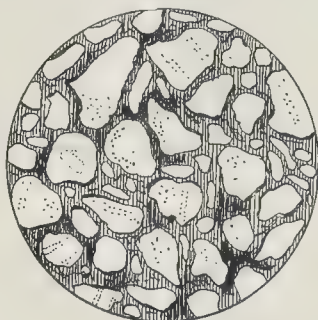


Fig. 2. Micro-Structure of Quartzite.

for, although very hard, it lacks the quality which all good materials for road-making should possess, namely, toughness. The principal object of our describing and illustrating the structure of quartzite is to show the student how a sandstone may gradually be altered by metamorphism until it becomes useless for building purposes.

Slate.—Metamorphosed clay; chemical composition silicate of alumina, with variable proportions of iron and other mineral matter, according to purity. Good slate may be split up into exceedingly thin slabs, the planes which determine the direction of the splitting being termed cleavage planes. Ordinary clay on being examined under the microscope is seen to be composed of minute particles of matter indiscriminately mixed together; moreover, it is normally soft and plastic. On looking at the micro-structure of slate (fig. 3), on the other hand,

Cleavage structure has been artificially produced for the purposes of lecture-room demonstration.

The precise thickness into which slates can be split is determined by two factors, (1) by the relative size and character of the particles composing them, and (2) by the amount of pressure exerted by Nature in their formation. The latter is not, perhaps, so frequently the cause of “bad slate” as the former. On entering a slate quarry the visitor sees an immense amount of waste material which cannot be cleaved at all, although it was found amongst the good slate. This is inevitable from the variable nature of the original “clay,” which is mostly composed of layers of fine clay, alternating with thin bands of clayey sands, more or less impure, or with streaks of sand, &c., &c. If the clay were uniform in structure, and the pressure used in producing the slaty cleavage in it were uniform throughout the mass, we should not expect to find any slate which would not properly cleave in the hands of the experienced workman.

Slate frequently contains much iron pyrites. It is a most useful material; the thicker slabs, which are not suitable for roofing purposes, are employed in the construction of cisterns, billiard-tables, counters, chimney-pieces, &c. It is often enamelled, and, we are sorry to add, is then made to do duty as “marble” of various kinds, the patterns being produced by the enameller. In the districts where slate is quarried we have seen thick blocks of it used in building the walls of houses; and the odd chips and refuse are sometimes manufactured into bricks of excellent quality; we feel sure that there is a greater scope for this than has hitherto been imagined.

Other well-known metamorphic rocks, occasionally used locally for the rougher kinds of building, and for road-metal, are gneiss and schist, of which there are many varieties in the British Isles, but which have no special attraction for the architect. They sometimes crop up in cases connected with water supply, however, when the joints and cracks in them on a large scale have to be studied rather than the substance of the rocks themselves.

GENERAL BUILDING NEWS.

MORLEY, YORKS.—On Saturday, September 16, the foundation-stone of the new church of St. Paul's, Morley, was laid by the Dukes of Devonshire, to whom a silver trowel was presented by the teachers and children of the Sunday School. The new church is being built upon the site of a small and poorly-built building erected in 1877. The old building has been removed, and is to be partially rebuilt as part of the north transept and vestries in the new church. The new church consists of a nave 95 ft. long, 28 ft. broad, and 40 ft. high, and is divided into five bays. The two easternmost arches, of arcade on either side, open into north and south transepts, the latter being double gabled, and form the nave of a side chapel. An apsidal baptistry is placed at the west end, with north and south porches. A lofty arch, carried up into the roof, divides the nave from a chancel 44 ft. in length and of the same height and width as the nave. The altar is raised nine steps from the nave floor level, and sanctuary, fitted with requisite accessories and ample space, is allowed for a large choir organ chamber and vestries, and heating arrangements are placed on the north side of chancel. The church, when completed, will accommodate nearly 900 adults. The cost of the nave, i.e., the portion now in hand, will be about 5,500l., and the cost of chancel, vestries, and chapel will be about 3,000l. The building is being carried

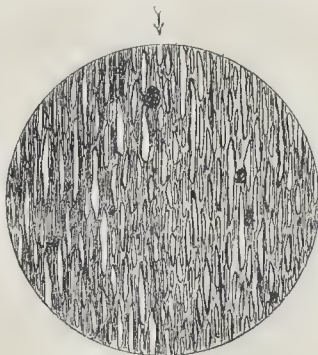


Fig. 3. Micro-Structure of Slate.

the student perceives that the minute particles have assumed a definite position; they are more or less elongated, and occur in lines or planes

out from the designs and under the immediate supervision of Mr. George H. Fellowes Prynne, of Westminster, and the contract has been undertaken by Messrs. Sugden Bros., of Morley.

ABERDEEN UNIVERSITY EXTENSION SCHEME.—The works embraced in the second instalment of this large scheme have now been contracted for—being the extension of the north wing at Mansfield College, and containing accommodation for the departments of chemistry, botany, surgery, and pathology. The aggregate of the accepted offers is, in round numbers, 17,000*l.* At the same time, the tender of Mr. John Morgan, builder, Aberdeen, for the whole of the works comprised in the heightening of the central tower, and amounting to 5,574*l.*, has been accepted. This tower, which will be a conspicuous feature in the new buildings, is the gift of Mr. Mitchell, of the firm of Sir W. G. Armstrong, Mitchell, & Co., Newcastle. Of white granite, the tower and spire together will reach a height of 230 ft., for about 150 ft. of which the structure will be 40 ft. square. The architect is Mr. A. Marshall Mackenzie, A.R.S.A., of Messrs. Matthews & Mackenzie, architects, Union-street, Aberdeen.

WAINFLEET ST. MARY, LINCOLNSHIRE.—This parish church was re-opened on 12th inst. after restoration. The work, which was carried out as a memorial to the late Mr. James Martin, of Wainfleet, includes taking down and rebuilding the north arcade, organ chamber, new roofs, reseating, and paving. The outlay has been about 1,600*l.* Mr. J. Boothroyd Curby, of Stamford, was the architect, and the work was executed by Mr. J. T. Turner, builder, of Wainfleet. The heating apparatus (hot air) was fixed by Messrs. Trusswell & Son, of Sheffield; the wood-block floors by Mr. Roger Love, of Farnworth.

GRAMMAR SCHOOL FOR OLDHAM.—The foundation-stone was laid on the 16th inst. of a grammar school for boys and girls living within the parliamentary borough of Oldham. The school is to be built and endowed from the funds of the Hulme Trust estates. The architect (Mr. J. W. Firth) in his description of the schools states that they are being built to accommodate 250 boys and 150 girls, on a plot of land about eight acres in extent. The buildings are to be placed on the crown of the hill, with the front to the south-west, overlooking Manchester. A large space of land is being reserved behind for a playground for the boys, and the land at the front of the buildings is to be laid out in terraces, with lawn-tennis grounds and for outdoor games. The basement floor will contain gymnasium, dressing-rooms, a workshop for boys and a recreation-room for girls, separate dining-rooms, and also drying stoves for clothing. On the ground floor will be separate entrances with offices or waiting-rooms, private rooms for use of master and mistress, with lavatories, &c. There will be a large central hall capable of seating about 600 persons, with corridors round the same on three sides, from which will be access to thirteen classrooms, lighted from the left, and with a separate desk for each scholar. A laboratory is also provided to accommodate thirty-six students. The style of the building is Gothic. The school is to be built with Ruabon bricks, with red terra-cotta dressings, with heads and sills of stone. The whole of the contract is let to Messrs. C. Selous, Ltd. & Co., of Oldham.

NEW HIGHER GRADE SCHOOL, CHEETHAM.—The foundation-stone of the new higher-grade mixed school which the Manchester School Board is erecting at Heath-place, Cheetham, was laid by Mrs. C. P. Scott on Saturday. The architects are Messrs. Royle & Bennett, whose plans show a building having a frontage to Heath-place of 120 ft. The structure will be three stories high, and will accommodate 500 boys and girls on the first floor, which comprises six classrooms and a hall, together with a master's room, teachers'-room, and two cloak-rooms. The ground floor contains a gymnasium or assembly hall, two cloak-rooms, a manual instruction-room, a teachers' room, and two covered playgrounds. The second floor contains a drawing-room, two science classrooms, a chemical laboratory with store and balance rooms, a cookery classroom, and a teachers' room. There are three spacious and easy staircases, all giving convenient access to the corridors, which directly communicate with the various rooms. The total cost, including the site, furniture, and fittings, will amount to about 15,000*l.* The contractors are Messrs. R. Neill & Sons.

THE NEW "BENTHAM BUILDINGS," NEWCASTLE.—The new property called "Bentham Buildings," lately erected in The Side, is a handsome structure in the style of the Italian Renaissance, the bottom story being built of red Aberdeen granite, with polished dressings and fine axed sandstone, whilst the superstructure is faced with Prudham stone. The ground floor is occupied as a depot by the owner of the premises, Mr. J. H. Bentham, for the sale of goods, and there is a large warehouse behind, and extensive cellars underneath. The suite of offices on the first floor is occupied by Mr. Bentham, and connected with the ground floor by a circular iron staircase. In the rear of the first floor, and on the floors above, are five other suites of offices to be let, and a residence for a caretaker. The entire block has been substantially built, and its elegant and modern improvements present a

striking contrast to the old-fashioned building which formerly stood on this site. The work of the new premises has been carried out by Messrs. J. & W. Lowery, from the designs of Mr. Edward Shearbrooks, architect. Mr. Robert Beall executed the granite work and carving; the plumbing was entrusted to Mr. Mansfield Gibson; and the drainage was laid under the supervision of Mr. Thorburn, of the North-Eastern Sanitary Association.

RESTORATION OF HINTON BLEWITT CHURCH.—The quaint old church has been in a dilapidated state since it was struck by lightning some years since. At that time the chancel roof was restored, and now the chancel has been thoroughly renovated. The floor, which used to be on a level with the nave, has been raised some 8 in., and, in place of the old stone paving, has been relaid with encaustic tiles and blue hia steps. New stalls of unvarnished oak have been also placed in the chancel. The old oak pulpit, with its sounding canopy, has also undergone some improvements, the principal of which is a couple of black enameled wrought-iron rails. The old "three-decker" has been removed, and a new unvarnished oak reading-desk substituted for it. Considerable improvements have been effected at the west end, the old oak gallery having been removed, and the fine old arch, which it effectively concealed, renovated and brought into prominence again. A new oak door has also been substituted for the dilapidated affair which formerly existed at the western entrance. The old carved stone font, with a square basin, has had a new shaft affixed to it, and been brought out from its place of concealment under one of the columns, and placed in a prominent situation at the foot of the nave.

OPENING OF THE NEW ISOLATION HOSPITAL, TAMWORTH.—On Monday afternoon the new hospital, which has been erected by the Joint Isolation Hospital Board, was publicly opened by Mr. Sydney Fisher, the donor of the site, which contains two acres, and cost about 500*l.* The buildings are in three blocks, two of them containing wards, and the other being the caretaker's residence. Provision is made for two beds, but this number can be considerably extended on emergency. All the latest improvements are introduced. The architect was Mr. H. J. Clarson (Surveyor to the Joint Board), and the contractor Mr. E. Williams, Tamworth. The cost of the buildings and furniture is about 2,000*l.*

EARLS COLNE GRAMMAR SCHOOL.—New Grammar School buildings at Earls Colne were opened last week. The erection of the school was commenced by Mr. Joseph Beard, of Chappel, according to plans and specifications prepared by Mr. J. W. Clark, of Coggeshall. The building, which is of red and white brick, contains four rooms and the necessary ante-rooms. They consist of a large schoolroom and two classrooms, intended to accommodate from sixty to eighty scholars, and a chemical laboratory. The rooms are lofty and well lighted, and the sanitary arrangements are satisfactory. There is a large gravelled playground, and two acres of grass land are available for football and cricket. About 1,250*l.* has been spent on the school and premises, excluding the furnishing of the laboratory.

WIGAN.—A new home for the Sisters in connexion with the Parish Church of All Saints, Wigan, was opened on Tuesday last by the Dean of Lincoln. The home is a large one, in the Elizabethan style of architecture, with upper portion of oak half-timber. The entrance porch is also in oak. The oratory is fitted up with stalls, &c., as a private chapel. The architects are Messrs. Heaton & Ralph, Wigan, the builder being Mr. C. B. Holmes, Wigan. The whole has been carried out by the architects to the instructions of Canon G. T. O. Bridgeman, Rector of Wigan.

SANITARY AND ENGINEERING NEWS.

ADMIRALTY EXTENSION BUILDINGS.—We understand that the contract for warming and ventilating the Admiralty Extension Buildings, Whitehall (Messrs. Leeming & Leeming, architects), has been placed with Mr. J. Jeffreys, of Westminster, whose scheme was selected in competition by the assessor appointed by H.M. Office of Works. The system adopted is low pressure hot water, supplied from two Cornish boilers in the basement, with 8-in. rising and 4-in. distributing mains to the several floors, fixed in covered trenches and serving radiators in the corridors, staircase offices, and larger rooms requiring supplementary heat to the open fires provided in the architects' design. With the exception of the first floor, the building will be ventilated by fresh-air inlets in the outside walls connected with "Jeffreys" ventilating radiators. In summer these radiators will be used as ordinary room ventilators for admission of cold air. The extraction of foul air will be by means of the internal walls, fitted with extraction ventilators. The first floor will be heated by warm air forced by a "Schiele's" fan over a battery of steam pipes, and distributed to the rooms through registers in the walls, connected with a warm-air duct formed in the ceiling of ground-floor corridors. The external air, before passing through the fan, will be cleaned by wire screens in the fresh air shaft, fitted with a water-spray for removing impurities as fast as collected, ensuring a free passage of the incoming

air. After passing over the battery the warmed air will be moistened by a water-curtain, and regulated by a hygrometer to the proper degree of humidity. A steam boiler is provided for supplying power to the engine driving the fan, also for heating the steam-pipe battery, and supplying hot water to the lavatories by means of steam heaters in various parts of the basement. The steam-power will be utilised in addition for pumping the sewage from a sump in the basement to the level of the sewer. The whole of the cast-iron pipes used in the work will have lathe-faced flanges. If placed in line, this piping would extend a distance of rather more than two and a half miles.

THE SANITARY INSTITUTE.—An extensive syllabus of lectures and demonstrations for Sanitary Officers during the coming season has been prepared by the Sanitary Institute, Parkes Museum, Margaret-street. The course will open on Friday, the 29th inst., with a lecture on elementary physics and chemistry, to be followed, on October 3, with a lecture on lighting, ventilation, and warming, by Sir Douglas Dalton. Numerous others will be given by well-known experts at frequent intervals during that and the ensuing month. The programme also includes visits to sewage farms and works, disinfecting stations, isolation hospitals, and other places of special interest to the students in London and the environs.

THE NEW DRAINAGE SCHEME AT GRIMSBY.—A meeting of the Grimsby Town Council was held on the 24th inst., the Mayor in the chair, to consider the tender received for the carrying out of the proposed new drainage and other works, and to determine what tenders should be accepted and contracts entered into.—The Mayor said the recent development of typhoid fever in the town indicated that even the precautions and arrangements which they already contemplated were not sufficient to meet the whole sanitary requirements of the town. It was now suggested that they should have a well bored, and they were informed that they could have one yielding 500 gallons of water per minute for 300*l.* complete. The committee and a sub-committee had opened the tenders for the drainage works, and the lowest tender for the sewage work and the pumping-station was that of Mr. A. F. James, for 17,950*l.* 10s. 7d., which was accepted.

THE DROUGHT.—The reservoirs at Bath now contain only 3,000,000 gallons of water. The springs for the past month have decreased in yield from 757 gallons a minute to 725 gallons a minute, or 1,044,000 gallons daily, against 1,259,000 gallons this time last year. The water is now cut off fifteen hours out of the twenty-four, which has reduced the consumption by about four gallons per head daily, but notwithstanding this the reserve is being drawn upon at the rate of 100,000 gallons a day, so that at this rate the reservoirs will be exhausted in a month. The facilities for storage at Bath are limited to 10,000,000 gallons, but contractors are being invited for a reservoir to hold 50,000,000 gallons. As there are only a few days' water supply in the Glosop reservoirs, the Corporation have decided to cut the water off from 8 p.m. to 7 a.m.—A water famine is feared in Dublin. The officers of the Corporation last week commenced a house-to-house visitation, in order to see that no waste is permitted, owing to defective pipes. Where water is used for other than domestic purposes the supply is cut off.

The Meteorological Office is given that, on and after the 16th inst., until further notice, the supply of water to the town will be discontinued from six o'clock in the evening to six o'clock in the morning.

LONDON WATER SUPPLY.—In their report for August on the quality of the water supplied to London last month, Professor Crookes and Professor Colling state: "The long-continued dry weather, which had lasted from March to the middle of June, showed signs of breaking during the latter month, and when writing our last month's report we were able to say that the rainfall for July had been 3.70 in. at Oxford, whereas the mean fall for twenty-five years was 2.58 in., showing an excess of 1.12 in. The sudden and excessive rainfall, following one of the longest droughts ever recorded, was extremely slight in respect to the variation in quality of the metropolitan water, and imperceptible in respect to any injurious tendency. This excessive rainfall was not kept up during August. The mean fall for this month, over an average of twenty-five years, is 2.24 in. at Oxford, while the actual fall has only been 1.01 in., showing a deficiency of 1.23 in. During the whole of the month there was only two really wet days, namely the 4th, on which 0.35 in. and the 22nd, on which 0.26 in. of rain fell; the rest of the month's rain, amounting to four-tenths of an inch, being distributed over eight days. The excess of rain in July being 1.12 in. and the deficiency in August being 1.23 in. it is seen that for the two months the rain has been 0.11 in. below the twenty-five years' mean, whilst, including June, the three months' deficiency amounts to 1.55 in. The Royal Commission which was appointed to ascertain whether the sources available within the water-sheds of the Thames and Lea are adequate in quality and quantity for the water supply of the Metropolis has finished its labours, and has just presented its report to Parliament. The commission express the opinion that the water as supplied to the consumer in London is of a very high standard of excellence and purity, and that it is suitable in

quality for all household purposes. With respect to the quantity of water which can be obtained from the water-sheds of the Thames and Lea, they are of opinion that an average daily supply of 40,000,000 gallons can be fairly obtained from the wells and springs in the Lea Valley. From wells in the chalk area on the south side of the Thames, in the district of the Kent Company, they estimate that a daily average of 27,500,000 gallons might be obtained. With adequate additions to the present system of storage they think that from the River Lea 52,500,000 gallons might be taken daily, and by the construction of storage reservoirs in the Thames Valley it would be possible to obtain an average daily supply of 300,000,000 gallons, without taking in any objectionable part of the flood water and leaving at least 1,000,000 gallons daily to flow over Teddington Weir into the tidal part of the river. From the sources and by the methods which they set forth a total daily supply of 420,000,000 gallons might, in their opinion, be obtained. This they consider would be sufficient to supply 35 gallons per head to a population of 12,000,000 persons, which is about three-quarters of a million in excess of the total population which Greater London, together with the outlying parts, would have attained in the year 1901, even if the ratio of increase in the period of 1881-1891 were fully maintained.

INSANITARY STATE OF THE MANCHESTER SHIP CANAL.—Much alarm is being felt in Manchester, Salford, and neighbourhood owing to the insanitary condition of the Manchester Ship Canal. The canal, which flows daily to flow over Teddington Weir into the tidal part of the river. From the sources and by the methods which they set forth a total daily supply of 420,000,000 gallons might, in their opinion, be obtained. This they consider would be sufficient to supply 35 gallons per head to a population of 12,000,000 persons, which is about three-quarters of a million in excess of the total population which Greater London, together with the outlying parts, would have attained in the year 1901, even if the ratio of increase in the period of 1881-1891 were fully maintained.

PRESENTATION TO A SURVEYOR.—Mr. Thomas Bennett, C.E., late Surveyor to the Cheshunt Local Board, has been appointed managing engineer to the Cape Town Waterworks Company. There were seventy-three applicants for the post. Several of Mr. Bennett's friends residing at Cheshunt, on hearing of his success, thought they would not like him to leave England without some token of their esteem. A committee was formed, and over forty persons subscribed, upwards of 40*l.* being collected. With this amount the committee purchased a handsome gold watch and chain, which, together with a purse containing a balance of 9*l.*, was presented to Mr. Bennett on Thursday.

NEW BATHS FOR MARYLEBONE.—The Local Government Board, acting on the advice of Colonel Lugard, R.E., who was appointed to make inquiries in the matter, have decided to grant permission to the Commissioners of Baths and Washhouses for the Parish of St. Marylebone to borrow the sum of 20,000*l.* for the purpose of reconstructing the public baths in Marylebone-road. It is proposed by the Commissioners to borrow the money over a period of several years, so that the burden will not fall heavily on the ratepayers.

STAINED GLASS AND DECORATION.

ST. MARY'S, CRUMPSALL, MANCHESTER.—This church has reopened on Sunday last after an entire decoration. The exterior arcades of the chancel have been filled with paintings, life-size, of the apostles, evangelists, Latin doctors, and later saints—two in each arcade. The paintings are in spirit fresco in the style of the late fifteenth-century, and are based on examples of Dürer, Memling, and Van der Weyden. The paintings were executed by Messrs. Percy Herbert, and Archie Bacon (working under the style of Percy Bacon & Bros.).

ST. PETER'S, PLAISTOW.—A new three-light window has been recently placed in this church. It represents three English female Saints, St. Eanswide, St. Osyth, and St. Ethelburga, the central light being a portrait of the lady whom the window commemorates. The window was erected at the cost of Mr. Robert Hunt, of Upton-park, and executed by Messrs. Percy Bacon & Brothers, who have already one window in the church, both windows being put up under the supervision of Sir Arthur Blomfield.

FOREIGN AND COLONIAL.

FRANCE.—MM. Bonnat, Bouquereau, Puvion de Chavannes, and Paul Dubois have been named members of the jury for the competition opened to French glass painters for the execution of the windows for the Cathedral of Orleans. The windows are to illustrate the principal events in the life of Joan of Arc.—At the cemetery of Montmartre has just been inaugurated the monument raised to the memory of Collavru, formerly a deputy and president of the Conseil de l'Ordre du Grand Orient de France.—The monument is the work of the sculptor Beylard.—At the Père La Chaise cemetery has been inaugurated a monument to Emile Eudes, a celebrated revolutionary, who was general during the insurrection of the Commune. M. Tony Noël is the sculptor.—The Museum of Saint Germain has been enriched with a precious collection of antiquities discovered at Rosnay-sur-Seine and near Mantes. These archaeological remains include medals, sarcophagi, and portions of the substructure of a Gallo-Roman basilica, and a pagan altar very well preserved.—Mme. Laure Coutan has been commissioned by the Government to execute a large decorative statue to adorn the Palais Mustapha, the residence of the Governor-General of Algeria.—The committee formed with the view of erecting a monument to Meisomer in the principal square of Poissy, has accepted the design of M. Fremiet, which represents the painter standing, in his working costume, holding palette and brushes in his hands.—The inauguration of the statue of General Lassalle, killed at the battle of Wagram, will take place at Luneville on October 8. It is an equestrian statue, and was exhibited in the Salon of this year.—To-morrow (Sunday) is to be laid the first stone of a monument which Mgr. Pagis, Bishop of Verdun, is raising at Vaucouleurs to the memory of Joan of Arc. The restoration of the ancient chapel in which the heroine used to pray has just been completed.—It is announced that, in spite of the strong protestations of M. Pons, the architect of the Department of Aveyron, the municipality of the little town of St. Sernin-sur-Rance have demolished a picturesque fifteenth-century house which served as the Mairie, and was well known to tourists.—The death is announced, at the age of 76, of M. Adolphe Yvon, a well-known military painter. M. Yvon was born at Esehwiller (Moselle), and worked in the atelier of Paul Delaroche. When still young he executed a series of designs from Dante, "Les Sept Péchés Capitaux," which obtained him a première médaille at the Salon of 1847. His first large painting, which belongs to the Versailles Museum, was the "Retraite de Russie," which gained for its author the cross of the Legion of Honour in 1855. M. Yvon was sent by the Government to the Crimea to follow the operations of the Anglo-French army, and made a series of large pictures of events in that campaign, of which the most celebrated is "Le Prise de la Tour Malakoff," which obtained the médaille d'honneur at the Salon of 1857; then followed two other pictures which attracted much attention, "La Courtine" and "La Gorge de Malakoff." After the war in Italy M. Yvon once more received the commission of the Government, and painted two pictures, "Magenta" and "Solferino," which, like the "Prise de Malakoff," are also at Versailles. After the International Exhibition of 1867, M. Yvon was named officer of the Legion of Honour. In 1883 he was appointed Professor of Drawing at the Ecole Polytechnique, as successor to Léon Cogniet. Since the war of 1870 he had almost entirely occupied himself with portrait painting. Among his more recent works of this class may be mentioned the portraits of Dr. Pén, of M. Paul Bert, and of M. Carnot, the latter of which at present figures in the centre of the French Section of Painting at the Chicago Exhibition.—We have to record also the death of M. Victor François Hügelin, architect, of Paris (where he died), who was a frequent contributor to the "Revue Générale de l'Architecture" since 1854. He published there a number of remarkable drawings, and was much appreciated as an able artist and draftsman. Another architect who has just died is M. Hachet-Souplet, of Saint Quentin, Vice-President of the Société des Arts, founded in that town, and President of the Société des Architectes de l'Aisne.—M. Nagel, sculptor, has completed the monument commemorative of the siege of Maubeuge in 1793. The monument is adorned with a statue representing a young drummer aged sixteen years, named Strauß, who conducted himself with great bravery in the siege, and was killed while beating the "Charge."

THE ANTWERP INTERNATIONAL EXHIBITION.—The International Exhibition, which is to be held at Antwerp next year, will be completed on May 5 and close on November 12. The exhibition will include products of all the industries, as well as of the arts and sciences, and it will comprise special Naval, Military, Colonial, and African sections. The Arts section will be under the auspices of the Royal Society of Fine Arts of Antwerp, which will hold a special exhibition of paintings, sculpture, and medals, engravings, and lithographs, and architectural models and drawings. The other groups are the following:—Education, the liberal arts, art industries, mineralogy, engineering construction, smaller mechanical industries, electricity, textile industries, clothing, locomotion, chemical industries, substances of food as products of industry, civil engineering, navigation, trade, the art of war, agriculture, forestry, fisheries, and horticulture, as well as the building and house-furnishing trades, making altogether twenty-two groups. In the building and house-furnishing trades will be shown building materials, plant, and tools used in the building trades, heating, ventilation, and lighting apparatus, furniture and upholstery, toys and baskets, and bric-a-brac. The site of the exhibition is in the new quarter of Antwerp, near the river Scheldt and the new docks. It will cover an area of about 2,000 acres, and will be connected with the principal railways. The main buildings will be very extensive, covering 120,000 square yards of ground, and including halls for exhibiting industrial and commercial products, machinery and electrical appliances, as well as a concert-hall measuring some 6,000 square yards. The exhibition will be built of iron and steel, and roofed with zinc. Intending exhibitors should apply for forms of application for space to "The Executive Committee of the Exhibition," No. 9, Rue Gérard, Antwerp, not later than October 1 next. The necessary steps have been taken by the Belgian Government to prevent any infringement of patent rights and trade-marks. An international jury will be appointed for giving the awards, which will comprise diplomas and medals (grand prizes), diplomas (honour), gold, silver, and bronze medals.

MISCELLANEOUS.

A TOTTERING CHURCH.—Alarm has been caused in the little Lincolnshire parish of Sutton St. James by the church walls suddenly developing huge rents, the jambs and tracery of the windows shifting out of their places, and the entire fabric, especially the apsidal east end, being in a tottering condition. The edifice has altogether the appearance of having been subject to some sudden and violent subterranean disturbance. Some of the rents in the masonry are very large, and the condition daily becomes worse. The building is six inches out of the perpendicular. Temporary steps have been taken to prevent the tracery and glass falling out by boarding up, and, meanwhile, a consultation of architects has been summoned. Only a few years ago 1,600*l.* was spent in the restoration of the church. The architect, Mr. Bassett Smith, of London, in his report says the subsidence has been caused by the dry weather acting upon foundations which consist of clay and silt, the result being a contraction of the soil. The east end walls of the church have bulged five inches. The three sides of the apse wall require rebuilding, and the foundations must be lowered several feet to prevent the action of the weather in the future on other parts of the edifice.

SUBSIDENCE IN THE CITY-ROAD.—There have of late been subsidences of the roadway near Wesley's Chapel in the City-road, and these have been generally attributed to the openings made for gas and water mains. The Surveyor to the St. Luke's (Middlesex) Vestry told the members on Tuesday that the real cause of the subsidence was the existence of springs which silted the sands and earth, and there was great danger in the fact that the gas mains were practically left without support beneath them. Should these mains drop there was the danger of explosions of a very serious character. The Surveyor said it was a matter for the London County Council, who had the control of the main drainage.

THE RATEABILITY OF SEWAGE WORKS.—In the House of Lords, last week, judgment was given by the Lord Chancellor in three appeals which involved the question of the nature and extent of the liability to the rates of the London County Council, in respect of pumping stations, outfall sewers, &c. It had been contended on behalf of the County Council that these works were not used, and were incapable of being used, for purposes of profit, and that the amount of assessment ought, therefore, to be merely nominal; and to this contention the Court of Appeal had practically given effect in the cases of St. George's and West Ham, but had decided in the opposite sense, on authority of a precedent, in the Erith case. The Lord Chancellor, in the course of an elaborate judgment, dwelt on the unsatisfactory state of the law, and of the decisions of the Courts in regard to the questions involved, holding that beneficial occupation in the sense of the making of profits was not essential in order to make the hereditaments liable to rating, and pronounced that the judgment of the Court of Appeal must be confirmed in the Erith case, and reversed in the other two. The other law lords concurred. The effect of the judgment is that the pumping stations and outfall sewers—the latter only so far as they are above ground—will be liable to rates in the ordinary way.

TRADE ANNOUNCEMENT.—Messrs. Fambirni & Daniels have just completed the extension of their art concrete works at Lincoln, and have taken as a managing partner Mr. F. Webster, of Lincoln.

APPOINTMENT OF SURVEYOR.—ASHBY-DE-LA-ZOUCH.—Mr. T. B. Warren, Southam, has been appointed Surveyor and Inspector of Nuisances to the Rural Sanitary Authority, out of sixty applicants. The post was rendered vacant through Mr. Metcalf having accepted another appointment.

Fastener.—16,814. T Hyom, Door Slam and Fastener.—16,820. J. Langfield, Heating, Drying, and Ventilating.—16,820. J. Tweedale, Art Metal Work.—16,840. A. Cl...

Thomson & Barstow	3,299	0	0	Evan Williams	7,658	0	0
T. Richards	8,088	10	11	Watkin Williams	7,500	0	0
C. Jones	7,946	0	0				

RICHMOND (Surrey).—For addition and alterations to the station, Sheen-road, for the Town Council. Mr. E. J. Lovegrove, C.E., Borough Surveyor. Townhall, Richmond, Surrey.
 J. W. Brookings £335 0 0
 Ford & Son 535 0 0
 Scharen & Co. 271 0 0
 C. Eldridge 512 0 0

SOUTHAMPTON.—For erection of proposed infants' school. Torton near Southampton for the School Board. Messrs. W. H. Mitchell, Son, & Lutteridge Architects, 9, Portland Street, Southampton.
 Reek £274 0 0
 Stevens & Co. 2,222 0 0
 Roles & Son 2,214 0 0
 Crook & Sons 2,187 0 0
 H. Hild 2,177 0 0
 Light & Sons 1,157 0 0

SOUTHEND-ON-SEA.—Tenders for Campbell-road and Weston-road improvements. Mr. Copley, Borough Surveyor.
 Woodrums & Fry £44 5 0
 G. W. Spey & Co. 134 12 11
 W. W. Wray 134 12 11
 H. Potter 593 17 0
 W. Dixon 251 11 3
 R. Ballard 231 2 1
 T. Dutton 22 3 1
 W. Merritt 225 17 9
 E. & W. Eden, 18, Queen's Road 274 1 0
 W. H. Wheeler 214 15 8

THORNHILL (York).—Accepted for laying out 1½ acre farm excavating 7,000 cubic yards of earth &c. for the Local Board. The Engineer, Local Board Office, Thornhill, York.
 Wm. Doctman, Naisie, York, Dec. 1891 £250 0 0

YATE (Gloucester).—For laying a new system of drainage and excavating certain 13,000 cubic yards at the works, &c. for the Yate & Southbury Union. Messrs. J. Fletcher, Treas. C.E., Church-street, Gloucester.
 Ambrose Stephen £330 0 0
 Beaven & Son 277 0 0
 Jno. Perkins 233 0 0

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 2. Lichfield 10 Rochester 18 Oxford 25 St. David's 26
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 4. Peterborough 12 Gloucester 20 Worcester 27 Ripon 28
 5. Wells 13 St. Paul's 21 Bristol 28 Chester 29
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 7. Salisbury 15 Winchester 23 St. Asaph 30 Carlisle 31
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THE ANCIENT CATHEDRALS OF SCOTLAND.
 This series, which is in all respects similar to the above, began in July and will end in December, 1893.
 1. Glasgow 1 2. Aberdeen 3. Inverness 4. Edinburgh 5. Kirkwall 6. Dunblane 7. Perth 8. Dundee 9. Brechin 10. Arbroath 11. Forfar 12. Brechin 13. Arbroath 14. Forfar 15. Brechin 16. Arbroath 17. Forfar 18. Brechin 19. Arbroath 20. Forfar 21. Brechin 22. Arbroath 23. Forfar 24. Brechin 25. Arbroath 26. Forfar 27. Brechin 28. Arbroath 29. Forfar 30. Brechin 31. Arbroath 32. Forfar 33. Brechin 34. Arbroath 35. Forfar 36. Brechin 37. Arbroath 38. Forfar 39. Brechin 40. Arbroath 41. Forfar 42. Brechin 43. Arbroath 44. Forfar 45. Brechin 46. Arbroath 47. Forfar 48. Brechin 49. Arbroath 50. Forfar 51. Brechin 52. Arbroath 53. Forfar 54. Brechin 55. Arbroath 56. Forfar 57. Brechin 58. Arbroath 59. Forfar 60. Brechin 61. Arbroath 62. Forfar 63. Brechin 64. Arbroath 65. Forfar 66. Brechin 67. Arbroath 68. Forfar 69. Brechin 70. Arbroath 71. Forfar 72. Brechin 73. Arbroath 74. Forfar 75. Brechin 76. Arbroath 77. Forfar 78. Brechin 79. Arbroath 80. Forfar 81. Brechin 82. Arbroath 83. Forfar 84. 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Visitors' Staircase, Avery Hill, Eltham.—Mr. T. W. Cutler, F.R.I.B.A., Architect	Double-Page Photo-Litho
New Stabling, King's Walden, Herts two views.—Messrs. Beeston & Burmester, Architects	Double-Page Photo-Litho
Sculpture at the Chicago Exhibition	Double-Page Tone Block

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The Royal Commission on London Water Supply.



THE Report of the "Royal Commission on the Water Supply of the Metropolis" is now before the public. The accounts which have appeared in the daily papers appear to have been derived merely from a *résumé* of the proceedings supplied in advance to the Parliamentary Press, and do not give any basis for a full consideration of the subject; and, in fact, such consideration can only be based properly on the full evidence taken before the Commission, which is not yet printed, and may not be for some time to come. Our own reports of the proceedings before the Commission, carried on continuously from the first sitting of the Commission, furnish, however, a pretty full account of the main purport of this evidence.

We cannot regard the Report as at all a satisfactory result from the appointment of a Royal Commission to consider a subject of such great extent and of such vital importance to London. When it was first known that a Commission had been appointed to consider the subject, it was generally expected that the possible sources of water supply for London would be considered on the widest possible basis, and that the proper object of such a Commission should have been to take evidence as to all the sources of water supply for London which could be regarded as within practicable reach. Instead of this, the Commission was restricted at the outset to an inquiry limited according to the following formula, which forms the first paragraph in the report of the Commission:—

"Whether, taking into consideration the growth of the population of the Metropolis and the districts within the limits of the Metropolitan water companies, and also the needs of the localities not supplied by any Metropolitan company, but within the watersheds of the Thames and the Lea, the present sources of supply of these companies are adequate in quantity and quality, and, if inadequate, whether such supply as may be required can be

obtained within the watersheds referred to, having due regard to the claims of the districts outside the Metropolis, but within those watersheds, or will have to be obtained outside the watersheds of the Thames and the Lea."

The Commission was thus formally debarred from taking any account of what appears to us to be the most important question of all, viz., whether there is any adequate available source of supply to be found, within practicable distance of London, which would afford a sufficient supply entirely apart from the necessity of depending on the abstraction of water from the Thames. It was on this point, above all others, that we wished to have evidence; and this is entirely thrown on one side by the very conditions under which the Commission has been appointed. It will probably be many years before another Royal Commission is appointed to consider the subject, and thus we have been debarred, for an indefinite period, from obtaining the very evidence which is most of all to be desired.

One result of this restriction has been that the report of the Commission has practically taken what may be called a semi-political aspect. The ambition of the London County Council, rightly or wrongly, has been to formulate a new and independent scheme for London water supply; to buy up the London water companies, and to undertake officially the supply of water to the Metropolis. Being debarred by the conditions of its appointment from taking any such scheme under consideration, the Commission has almost insensibly become a kind of anti-London-County-Council enquiry. It has had to justify its position by showing that the schemes of the County Council were unnecessary and visionary. The bulk of the evidence tendered has been manifestly shaped in the interests of the London water companies, in reality if not ostensibly; and what ought to have been a local and impartial enquiry into all possible sources of water supply for London has been insensibly narrowed into an advocacy of the *status quo*. Witnesses representing more or less the interests of the existing water companies have had ample opportunity of making a case for themselves, and have furnished the bulk of the

evidence. No doubt a good deal that is of practical value has been elicited; but the net result of the long and costly labours of the Commission is that we are left pretty much where we were. We are assured that there is no harm to be apprehended, either to ourselves or to the river, from going on drinking up the Thames for another half-century or so (which we admit is as long a period as any Commission can reasonably be expected to deal with), and that in fact we are a great deal better off in the way of water supply than we had any idea of.

This is a consolatory conclusion, if true; and in some respects we believe it is true. We concur, for instance, in the opinion expressed in the Report that the quality of water at present supplied to London is for the most part very good. The impassioned denunciations of it which we have heard delivered, *ore rotundo*, at County Council meetings, were much exaggerated, and were obviously the deliverances either of people who were speaking on hearsay and with very little practical knowledge of the subject, or who had a policy to serve. In this latter respect they were just in the same boat with many of the witnesses before the Commission; it is six of one and half a dozen of the other. The quality of the water is good because great, and we believe conscientious, pains are taken by the companies to render it so by adequate filtering. But this is a constant struggle against adverse circumstances. Our opinion remains the same—that an open river flowing through a populated country is not an ideal source to draw drinking-water from; and that to continuously and increasingly deplete a running river for water supply is to spoil one of the greatest sources of beauty and health for the country through which it flows. The contrary idea is a superstition which we believe must give way in the long run. It was long considered that a running river was a naturally provided drain to carry away sewage. It took many years and much fighting to put down that superstition, which in many districts is rampant yet, so far as the law will allow it to be so. It is now the popular superstition that an open river is meant to furnish drinking-water. We look to a time when that superstition will be exploded also.

We should have been glad to find that the Report of the Royal Commission had done something to assist in exploding it. But the Commission in this sense is a Balaam. We looked to them to curse the river—as a drinking-cup; and behold, they have blessed it altogether.

However, in endeavouring to estimate what value there is in the Report of the Commissioners, we must for a moment adopt their standpoint and take them on their own ground. Having been commissioned to enquire into the sources of water supply for the Metropolis within the watersheds of the Thames and Lea, obviously the first thing to be done was to stake out the ground implied by the term "Metropolis," and the Commissioners eventually decided to adopt as a basis the City and Metropolitan Police District, which covers an area of 701 square miles, and may roughly be described as being comprised within a circle drawn round Charing-cross as a centre, with a radius of 15 miles. To this area certain outlying parts were also added as coming under the influence of London water companies.

The population within the City and Metropolitan Districts (Greater London), as found by the census of 1891, was 5,633,332; in 40 years the population had more than doubled itself. The Commission set itself the task of estimating the population of the same area 40 years hence, for that was the interpretation placed upon the "future" implied in the charge. It was very clearly shown that the population did not increase in the same ratio during the decennial period ending 1891, as in preceding periods; the question to be solved was whether the decrease was due to accidental fluctuation, or was to be taken as a sign that for the future the growth could not be estimated by analogy with previous periods. The conclusion arrived at was that the tendency of the rate of increase to diminish had not as yet been shown for a sufficiently long period to justify the adoption of it as a basis for estimation; and it was assumed, therefore, that the rate of increase in population during the next forty years might be based on that of the last decennial period, namely 1.68458 per cent. annually. Thus in the year 1931, according to this computation, greater London will be inhabited by 11,035,289 people—nearly double the present number.

We think that this estimate is, in reality, too high; the fact that the increase per cent. in population during 1881-1891 was only 18.2 as compared with 22.7 in 1871-1881, 20.6 in 1861-1871, 20.2 in 1851-1861, and 19.9 in 1841-1851, is surely not without significance. At the recent meeting of the British Association Mr. E. Cannan, of Oxford, showed that the net immigration into London in the last ten years was only 56 per cent. of what it was in the previous ten years, and only 63 per cent. of what it was thirty years before; the result of his observations was to show that there was a diminution of the net immigration from the country into large towns, and that, contrary to the general belief, the excess of immigrants over emigrants was rapidly diminishing, and seems likely to disappear before the end of the century. Assuming this to actually take place, though we are not altogether prepared to endorse the last statement, the only increase in the population of London would be by excess of births over deaths. In other words, there are good grounds for believing that the rate of increase during the present and future decennial periods will not be so high as during 1881-1891—the period on which the Commissioners have computed their figures. However, by taking the higher ratio, they, no doubt, acted wisely from the point of view of their inquiry, even though the figures are delusive, and led to more work in finding the necessary quantity of water.

The next important step was to ascertain the quantity at present supplied per head of population. The following table, relating to

the year 1891, shows this in a condensed form:—

Name of Company.	Net Supply per Diem.	Population.	Net Supply per head per diem.
	Gallons.		Gallons.
1. New River	32,649,076	1,150,260	28.10
2. East London	39,746,601	1,145,500	34.57
3. Chelsea	9,557,413	307,192	31.25
4. West Middlesex	15,414,207	377,234	40.71
5. Grand Junction	16,791,734	359,000	47.72
6. Lambeth	20,234,560	625,001	30.85
7. Southwark and Vauxhall	24,373,340	641,070	38.04
8. Kent	12,639,871	470,524	27.11
	171,103,385	5,499,791	31.19

The figures in column 2, it must be remembered, were largely based on information supplied by the water companies. Their usual method of arriving at these results was to ascertain from their books the number of their separate supply pipes, and, assuming that each such pipe supplies one household, to multiply the number of households, so assumed, by a factor representing the probable average number of persons resident in one house, as derived from the latest census returns. The Commissioners, however, soon became aware of the fact that the number of separate supplies was not equivalent to the number of houses supplied, and that the method of computation adopted was somewhat illusory. They also found on comparison that the water companies' estimate of the population in their area of supply exceeded the true number as ascertained in Greater London by the 1891 census. They therefore instituted an independent enquiry, based on the known population of the various parishes supplied, with the result that the total number came out at 5,237,062 persons. The only source of error in this calculation, they state, arises from the utilisation of water from private wells, &c., which they are inclined to believe is infinitesimal as compared with the whole.

For our own part we feel confident that a large number of persons are supplied with water from private sources; we have only to glance at the number of wells in the Metropolitan area daily being drawn from, to be convinced of this. It is perfectly true that the greater quantity of water thus derived is used for trade purposes, but at the same time it would not be difficult to specify a number of establishments where private wells are to-day giving out the only water consumed by a not insignificant population. We are therefore much surprised that the Commissioners should allude to the fact slightly. They say it is not possible to ascertain exactly the number of persons obtaining water from private sources, and therefore assume the whole 5,237,062 persons as the closest approximation that can under the circumstances be made. It is probable that this figure is a good deal in excess of the real number supplied, and forms an erroneous standard of comparison. Outside the parliamentary districts of the Metropolitan water companies and wholly or partly within the area of Greater London are a number of smaller companies and local authorities supplying water, but the Commissioners were unable to obtain very precise data respecting them, either as to the population served or the quantity delivered. From figures furnished by some, however, they base the present daily average thus supplied at 10,000,000 gallons.

Then, again, there seems to have been some doubt as to the actual quantity of water supplied by the eight large Metropolitan companies per day; the average amount returned to the Water Examiner under the Metropolis Water Act, 1871, not being quite in agreement with the figures furnished to the Commission by the companies. The difference was not a great one, and having regard to the circumstance that absolute accuracy could not be obtained so long as the quantity of water pumped was

calculated from the number of strokes made by the engines taken in connexion with the capacity of the pumps, they agreed to shelve the discrepancy. Such a method is, of course, vitiated by the unavoidable want of perfect tightness in the pump-valves, and by the failure of the non-rotary engines employed to maintain a uniform length of stroke.

Recognising the great value of having an independent opinion respecting the quantity of water supplied, however, they charged their Assistant Commissioner to investigate the question personally, and he arrived at the total amount stated in the first column of the foregoing table, viz., 171,103,385 gals. per day, which, calculating from the estimated population served, as stated by the water companies, gives an average consumption of 31.19 gals. per head per day, as shown in the third column. It will be observed that the supply per head varies considerably in different districts, ranging from 47.72 gals. in the Grand Junction Company's to 26.71 in that of the West Middlesex Company. It was indicated in the evidence that the high figure of the first-mentioned company was largely due to waste; it was found cheaper to pump up the water than to supervise and control the waste of water supplied. This may seem at first sight a very immoral state of things, and no doubt a reasonable amount of control ought to be exercised over the consumers; but on the other hand it must be urged that, except air, there is no element of which copiousness of supply is so desirable as of water; and there can be no doubt that the powers which the law gives to the water companies in the way of interference with consumers and their fittings are in reality far more drastic than they ought to be, and are abused by some of the companies in a most unreasonable manner, amounting to a petty persecution of a most irritating and often unnecessary nature. On this head we may have some facts to give on another occasion which will fully bear out this comment, but we cannot go into that at present. To proceed: deducting the quantity of water estimated to be used for trade purposes it was found that about 25 gals. per head per day was the average amount delivered by the whole of the companies. If we adopt the Commissioners' computation of the population served, viz., 5,237,062, we arrive at an average consumption, for trade and domestic purposes, taken together, of 32.68 gals. per head per day.

The main question before the Commission now stood as follows:—Can a sufficient supply of water (having regard to the foregoing statistics) of sufficiently good quality be obtained from the Thames and Lea valleys for the use of 11½ millions of persons without serious prejudice to the other inhabitants of those valleys? To answer this, as a preliminary, the geological structure and hydrological features of the two valleys were considered. It was pointed out that since the publication of the Report of the Duke of Richmond's Commission much new information had been gathered respecting the superficial deposits which so materially affect the descent of water underground, and special attention was therefore directed to these. In an enquiry of this nature it is of great importance to distinguish between the older formations out of which the valleys had been carved, and the newer deposits, for the most part only a few feet in thickness and spread irregularly over the surface. These superficial layers of sand, gravel, loam, clay, &c., conceal the rocks below, and more or less interfere with the access of water to them from above. A copy of the Geological Survey Map of the basins of the Thames and Lea, on the scale of 1 in. to a mile, was prepared for the Commissioners, from which it was seen that the older rocks in the region may be grouped in three great series—1st. The Jurassic formations; 2nd. The Cretaceous formations; and 3rd. The Tertiary formations. The first of these series is not found at the surface in the basin of the Lea.

Dealing first with the Thames basin, it is

veniently divisible into three parts, each which coincides with the area of one of the groups of formations just mentioned. The river has its sources in Jurassic strata; between Abingdon and Windsor it flows over Cretaceous beds, and below the last-mentioned place its course lies across the Tertiary formations to London. The superficial deposits in the basin occur as sheets or detached patches scattered over the older rocks; not only in the bottom of the valleys, but stretching a long way up their sides, even up to the tops of the watersheds. For the purposes of the inquiry the basin is divided into two parts—(1) that portion above the intakes of the water companies, and (2) the portion below them. Dealing with the first of these, with a total area of 48 square miles, we find that some of the older rocks exposed at the surface are readily permeable by rain-water, others are impermeable, and a third partially pervious. In the Jurassic part of the basin an area of 537 square miles is composed of pervious strata, 616 of impervious, and 169 of partially pervious. We need not discuss this portion of the inquiry; suffice it to say the Commissioners arrived at the conclusion that no addition to the present water supply of London is to be obtained by any operations conducted in the upper or Jurassic part of the Thames basin.

The rocks of the Cretaceous system occupy 1,420 sq. miles in the basin above the intakes, of which about 1,243 sq. miles are pervious, and 177 sq. miles impervious. The upper member of this system, the chalk, is by far the most important source of water supply in the south of England.

Of the Tertiary formations in the basin above the points of intake, 161 sq. miles are pervious, 366 impervious, and 279 of an intermediate character.

We cannot help noticing that whilst some ins are taken to estimate the areas occupied by the divers strata, classifying them according to their degree of porosity, no serious practical use is made subsequently of this information. It is one thing to estimate the amount of water absorbed on the basis of the percolation of a certain percentage of the rainfall; and quite another thing to arrive at any satisfactory conclusion as to what amount of the water which has percolated. Some of it comes to the surface again, whilst a large quantity is retained in the rocks, but considerable amount must be lost altogether by percolation into other areas outside the basin, for the geological structure of the ground bears very little relation to the watersheds in this case. Whilst, therefore, a great parade has been made as to the geology of the Upper Thames area, with special reference to the porosity of the rocks concerned, we cannot see that it has led to such practical result—the question has not yet been sufficiently studied. The same may be said concerning the superficial deposits; they are scattered so irregularly over the older formations that it is difficult to make satisfactory estimates of their respective areas, except upon the basis of detailed surveys; but these surveys have been completed for only a portion of the district in question, so that much of the information on this head is mere guess-work.

The report states that the basin of the Lea resembles that of the Thames below Abingdon in geological structure, but with this important difference, that its sources rise within the chalk and Tertiary districts, and are not increased by the influx of water from any other group of rocks, and with this further distinction that the Cretaceous area of the basin lies on the chalk and does not include the outcrop of any of the older members of the Cretaceous system.

Turning to the consideration of the present sources whence the Metropolitan companies derive their water we find they are four in number, viz.:—(1) the river Thames and the Lea; (2) gravel beds adjoining the main stream of the Thames, and other gravel beds at Hanworth; (3) natural springs; and, lastly (4) wells sunk into the chalk or other

strata. All the companies, except the Kent, are dependent for some part of their supply upon water derived from the two rivers mentioned. The New River and East London Companies take 22,500,000 gals. and 33,000,000 gals. respectively per day from the Lea; and, in addition, the latter company may take 10,000,000 gals. per day from the Thames. The remaining five companies derive their main supplies from the Thames, and have statutory powers to obtain 20,000,000 gals. each per day from the river. In 1886, however, an agreement was entered into between them and the Conservators whereby, on payment of a sum of money to the latter, a total of 20,000,000 gals. daily was allowed to be abstracted in excess of the amount already stated; and the excess was divided amongst the companies, each being allotted 4,500,000 gallons, except Chelsea, which was only allowed 2,000,000 gallons. Hence the curious and (to a cynical mind) amusing spectacle, in the evidence given before the Commission, of the Thames Conservancy, which we might expect would be specially anxious to keep as much water as possible in the river and preserve it in its best condition as a river, giving all their evidence in favour of the companies; asserting that the extraction of so much water from the Thames did not injure it in the least as a river; that much more might be taken without injury; and in fact all but committing themselves to the position that the more the water companies took out of the river the better it would be. The water companies are the Conservancy's best paymasters; in fact, the only source through which the Conservancy can make both ends meet; and it is not in human nature that it should denounce those who fill its pockets; but this is certainly, as we have before observed, a most original way of "conserving" the Thames. There seems, however, to be some doubt as to the legality of the withdrawal of this excess amount from the Thames; it looks very much like an evasion on the water companies' part of their Acts; but at any rate they believe that they are now empowered to take 120 million gallons, which, added to the 10 million gallons allowed to the East London company, makes up a total of 130 million gallons, which is the volume authorised to be drawn from the river at the present time by the Metropolitan companies for the supply of London.

Some of the companies, however, are very smart and have devised methods whereby even this quantity may be exceeded, as occasion may require, without having the trouble to go to Parliament for further powers. There are immense beds of gravel on the lands in close proximity to the river, and from these the Lambeth, Grand Junction, Southwark and Vauxhall, and East London Companies obtain large quantities of water, one company alone stating that it could get seven to eight million gallons a day from this source. The companies believe that water thus obtained has nothing to do with the statutory amounts allowed from the river, inasmuch as it is derived from wells sunk in the gravel, but the Commissioners very properly point out that if the water in the gravel beds were left entirely uninterfered with, it would gravitate to the river at its natural outlet, so that it is clear that the companies are not justified in claiming that the gravel supplies should not be counted as part of their authorised amounts.

We will not go into the details of the schemes proposed by the water companies to augment their present supplies; the following summary sufficiently states their views:—

	Gallons per day. Millions.
From the Thames with additional storage	300
From the Lea, with East London Company's projected storage	52½
From chalk springs and wells	87
	439½

In order to arrive at this amount the companies have suggested:—

- (1.) The abstraction of more water from the Thames without providing extra storage.
- (2.) Ditto, from the Thames and Lea, with provision for storage.
- (3.) Ditto, from gravel beds adjoining the Thames.
- (4.) Ditto, from deep wells in the chalk.

With reference to the first point, we find engineers of known standing recommend the simple solution of abstracting more water from the Thames without any storage; and it is argued that as the intakes of the principal water companies are situated between Sunbury and Molesey Locks, 200 millions more might be abstracted without making any appreciable difference in the state of the river, as the water is kept practically at a constant height by the Molesey Weir. So that we presume the argument runs thus: that when you have a certain amount of water distributed in a series of troughs one below another, if you pump water from the lowest trough and it is filled from the upper ones, you have not really taken anything out.

The proposal for storage reservoirs is a more practical matter, though some of the proposals of this kind brought before the Commission would not (in a double sense) hold water. A scheme was brought forward by Professor Henry Robinson to augment the present supply from the Thames by the construction of three impounding reservoirs in the Kennet valley; but it was found that the data upon which the scheme rested were unreliable, both in respect of the volume of water that could be collected from the watershed and of the water-tightness of the reservoir sites. A second scheme of storage was submitted by Messrs. Marten & Rofe on behalf of the Thames Conservators, and consisted of nine reservoirs to be constructed upon various tributaries of the upper Thames, and this was backed up by a number of scientific experts, though the whole of these reservoirs did not receive the unqualified approval even of the witnesses called for their promotion. Some of the selected reservoir sites were very bad, from a geological point of view, and the Commissioners dismissed the scheme on that and other politic grounds.

The third proposal was much more practicable than the other two; it was brought out by Messrs. Hunter & Fraser, of the Grand Junction Company, and consisted in the construction of nine reservoirs upon land in the neighbourhood of Staines, at only a few miles' distance above the existing works of the companies. In this scheme it was not proposed to dam up natural valleys; the storage capacity would be obtained by excavating below the surface in almost flat ground, and forming the material removed into banks so as to increase the depth. In this way a depth of 40 ft. would be obtained, the digging being entirely in gravel, which overlies the clay to a depth of from 20 to 30 ft.

There can be no question as to the suitability of the sites for the purpose; probably no one would dispute that. From a geological point of view, the bottom of the reservoirs, being formed of clay of great thickness, would be perfectly watertight; and the scheme has the additional advantage of being capable of being carried out in parts as occasion may require.

This storage reservoir scheme is the most satisfactory item in the proceedings of the Commission; since, if no effort is to be made to find any main source of water except out of the Thames, the storage system at least affords a chance of getting it without depleting the river much more than at present. That there is enough water in the river to supply London for a long time to come we do not question; but if the system of pumping out more and more as demands increase is once accepted, the demands will go on increasing, and the public in twenty years' time will begin to find out the mistake to their cost. The Commissioners make a point of the statement, at the conclusion of the Report, that as the average daily flow of the Thames at Teddington Weir, adding to it the amount abstracted by the water

companies, is about 1,350 million gallons, the companies might go on abstracting up to 350 millions daily, and still leave 1,000 million gallons to go down the river. It seems to be thought that 1,000 million gallons is a good round sum which ought to content anyone, and that as the water companies would not in that case be taking away much more than one quarter of the river water, there would be little to complain of. We should reply that one quarter of the water is a very large proportion to take out of a river, and such an abstraction would make all the difference between a full flowing river and a low and sluggish one; and we doubt very much whether the Commissioners, dealing with the matter merely as an abstract question of figures, have at all realised what is likely to be the practical effect of their proposals in spoiling the river, as a river; that is to say, as an important element of beauty and enjoyment for the neighbourhood of London. The proposed reservoirs, of course, would be a disfigurement of the country to some extent; but the Staines neighbourhood, the only site which has been admitted as a practical one for such reservoirs, is a flat and not particularly picturesque piece of country, and we do not know that it would suffer very much. We would certainly rather see the reservoirs than have the Thames spoiled, and spoiled it will be if it is to remain as the drinking-water conduit for London. For it must be remembered that the demand per head for water is almost certain to be an increasing, not a diminishing one. The evidence of some eminent engineers in regard to amount of water supply was given before the Commissioners, to show that the present rate of supply could be and ought to be diminished. The New River Company, Sir F. Bramwell said, would have to reduce their supply per head from the present 28½ gallons to 26 gallons, and so on of other companies, and that there was no reason why water for domestic purposes should not be reduced to 20 gallons a head, and Mr. Hawksley gave similar evidence. *In whose interests was this evidence tendered?* Mr. Hawksley very frankly said that he came there because he had received a retainer on behalf of the water companies, and they insisted on his appearing; and we presume that Sir F. Bramwell's appearance was on much the same grounds. These gentlemen seem to represent what may be called the antediluvian days of water consumption. One of the first medical men in London laid it down, in our hearing, that every healthy and cleanly person "should get into water every morning," i.e., should have a full bath to plunge under in; and this excellent habit is being adopted increasingly, and will be more so in the future generation. How far will the 20 gals. a day* go towards that, with all the other necessary household purposes? We do not want to know how little water we can do with; there are plenty of persons competent to work out that problem for themselves, but they are not the class of people whose ideas on sanitation and civilisation are usually considered of the first importance: we want to know how much we can have; and the suggestions of these expert witnesses for a further reduction of supply—suggestions made obviously in the commercial interests of the water companies—are an absolute mockery of the object, or what ought to have been the object, of the Commission. We are for the moment leaving on one side the question of danger to health from drawing water out of open rivers flowing through populated districts; the danger has perhaps been exaggerated by medical experts, but the rebutting evidence given before the Commission does not persuade us that this danger does not exist. But however that may be, it is certain that London above all other cities wants an ample supply of water; the ideas

of the majority of people as to what is meant by an ample supply are certain to extend rather than contract as years go on; and above all things we desire that the supply of an element which is a necessary of life should be taken from the hands of trading companies, which administer it for the benefit of their own shareholders, and be administered for the public benefit solely. And a Royal Commission which leaves us for ever in the hands of these trading companies; which proposes even to give them increased powers of control; which tells us that, if we are very careful, we can manage with so much (or so little) water as a maximum limit, provided we do not mind spoiling our river by perpetually increasing extraction of water from it, might almost as well not have sat at all.

NOTES.

THE speech of Mr. Fowler, the President of the Local Government Board, at the end of last week, on the occasion of the presentation of his portrait by the town of Wolverhampton, was one which should not go unobserved. In a word, it showed the great progress, moral and material, made by this country during the present century. Mr. Fowler regarded, and no doubt rightly, the successive diminution in deaths on each occasion of an invasion of cholera, as showing the improvement which has taken place in the health of the community. In 1849, the number of deaths was 52,000; in 1854, it was 22,000; and in 1866, it had sunk to 18,000; and this diminution in numbers corresponded with an actual increase in the population and with more careful registration. Again, Mr. Fowler pointed out that "in 1818 we spent seven and a-half millions on the relief of the poor, and in 1892, with a population of nearly thirty millions, the amount was only eight and a-half millions, whilst the poor were thoroughly well relieved." Again, out of a local debt in England of two hundred millions, twenty millions had been incurred for sewerage, six for free libraries, parks, and baths, five for artisans' dwellings, and twenty-nine for public improvements. The balance was incurred for lighting, schools, markets, and so forth. Mr. Fowler asked, for what had the local debt been incurred? and he duly answered, "for the happiness and improvement of the people; for fighting the battle against ignorance, vice, disease, and misery; and for elevating the whole community." It has been money well spent; from time to time—as is natural—mistakes have been made, but on the whole there cannot be a doubt that this expenditure has enormously improved the physical and mental health of the people, and has largely increased the aggregate happiness of the community.

THE nationalisation of mines, as of railways, is the pet dream of many a perplexed student of the ever-recurring and difficult problems presented by such contests as the coal dispute; and from the data made available by the publication of Sir George Elliott's scheme for a gigantic Coal Trust they will have ample material to work on from their point of view, and a good opportunity for airing rival projects. The *Times* of Wednesday in last week devoted three or four columns to the details of Sir George Elliott's colossal scheme, in which the lessee, the labourer, and the consumer are invited to amalgamate their respective interests in the entire coal deposit of this country. As usual in such schemes, each party to the bargain is promised substantial and attractive advantages—the first, in this case, of economies in working and administration which it is claimed, would result from a more systematic development of the coal deposits. It is a great co-operative scheme, quite distinct in its conception from the more familiar forms of trusts and syndicates; embodying much that is

sound, theoretically, if impracticable. The magnitude of the operation does not seem to have greatly impressed the originator, although he computes that the capitalised interest of the lessees would amount to 110,000,000/-. We imagine, however, that the Board of Trade would be very strongly impressed with the part assigned to them by the scheme—which amounts to nothing less than the safeguarding of the interests of all concerned, by being entrusted with power to regulate very largely both the price of the coal and the amount of profit. The apportionment of the latter is elaborately set forth—the purchaser to come in for a share (in the form of discount)—but only after interest and a sufficiently large dividend have been provided for. The general comment on this feature of the scheme is, that the prospective benefit to the consumer is altogether of the "deferred" order, while the *Economist*, speaking of the proposals from other points of view, pronounces it to be utterly impracticable and Utopian.

BY the death of Mr. Thomas Hawksley, F.R.S., at his residence in Kensington last Saturday, the profession has lost one of the most distinguished engineers who have been deemed experts in the construction of gasworks and waterworks. Mr. Hawksley was elected a member of the Institution of Civil Engineers, April 7, 1840, and subsequently became its President. Large boroughs, especially where pumping machinery was employed for raising water, consulted Mr. Hawksley, but his details were never so popularly known as in the case of other engineers' designs, because he never sought publicity beyond the approval of those by whom he was instructed. Probably fewer of Mr. Hawksley's drawings have been published in the professional press than those of his competitors. To him is attributed the introduction of constant service in water-supply, a very important improvement in a sanitary sense, as leading to abolition or great reduction of storage cisterns, so often the occasion of opportunity of water contamination. He was also an authority on sewerage schemes, where pumping was necessary to be introduced, and evinced at all times an interest in sanitation. In 1868, he was a valuable witness before the Royal Commission on Water Supply, known as the Duke of Richmond's Commission. In 1883, he appeared similarly before another Commission appointed to deal with the purification of the River Thames, and, so recently as 1892, was again examined upon the Metropolitan Water Commission, which has just issued its Report. His opinions before Parliamentary Committees were always respected and his estimates trusted. In 1887, when he was at the age of eighty, several friends in the legal and engineering professions subscribed and presented him with his portrait, which, being an excellent likeness painted by Mr. Herkomer, will remain an heir-loom in the family. His son is already a well-known member of the Council of the Institution of Civil Engineers, and has had a bright example of honesty, skilful application, and consequent success presented to him in the career of a father who was permitted to attain the ripe age of eighty-six years.

THE death of so gifted a painter as Mr. Albert Moore, at the comparatively early age of 52, will leave a notable gap in our annual exhibitions of painting, both at the Academy and elsewhere. Mr. Moore's range was limited, but within it he stood quite alone, and represented an element in contemporary painting which no one can replace. His pictures represented the charm of female form—sometimes nude, often draped, but draped so as to give full importance to the lines of the figure—combined with an exquisite and delicate harmony of colour in the draperies and

* The proposed supply of 20 gals. per head made by Mr. Hawksley and Sir F. Bramwell means about 20 gals. per head for domestic use, and the remainder for use in manufactures, &c., by meter supply.

accessories. His pictures, which in the realistic sense were absolutely devoid of subject, might be likened to graceful compositions in abstract music, in which pure beauty of tone and line are sought for, independent of any definite meaning. Some critics, American especially, held the exaggerated view that hence Mr. Moore was the greatest and most ideal English artist of the day; but inasmuch as painting is capable of expressing definite intellectual ideas and emotions, it must be held that a painter who expresses nothing beyond form and colour is restricted in his range. Even granting the completeness of abstract subjects such as those of Mr. Moore, he fell short in one most important element, intellectual and pathetic expression. His graceful women are dolls only, posed in charming attitudes, but totally destitute of character or individuality. We cannot admit that the greatest beauty of mere composition and colour can permanently atone for this intellectual deficiency. Nevertheless, Mr. Moore's pictures were charming creations of their kind, and they will long be missed.

THE Belgian triennial *Salon*, which was opened at Brussels last week, is very disappointing in architectural work. There has been no dearth of good public or domestic work in the country during the last three years, but no trace of it is seen in the Architectural Room of the exhibition. M. Jean Baes is the only Belgian exhibitor of standing; he sends a number of neatly-drawn plans, some tinted sections and pen-and-ink elevations of his new Flemish play-house, together with some excellent photo-lithographs of the same building from a publication by M. Lyon-Claessen. The exterior of the theatre, which shows a free rendering of the Flemish style in the national sandstones of the country, is remarkable for the way in which a feature has been made of the numerous emergency balconies surrounding both auditorium and stage. The effect of the auditorium may be said to depend mainly on colour; the *foyer* contains some excellent wrought-iron work. Of the non-Belgians of standing exhibiting there is only M. Cuypers, of Amsterdam, who has contented himself with the contribution of some photographs of the new Central Station at Amsterdam. M. Cols is the only architect whose work calls for attention among the many academical exhibits shown, and this for the most part only on account of the neat draughtsmanship he has shown on the three huge sheets with which he illustrates a design for a "Palais de l'Industrie." M. Moerman shows some neat pen-and-ink sketches. Perhaps the most remarkable feature of the architectural exhibit is the entire absence of any perspective drawings. Not even a single student's attempt was shown in anything but plan, elevation, and section. Some readers may say, so much the better.

THIS year's Art Exhibition at Munich has not received many contributions from architects, some dozen only having sent in drawings. Germany is but poorly represented, its only exhibitor of repute being Herr H. Seeling, of Berlin, whose work is, however, for the most part, shown in photographs. His cleverly-planned "New Theatre" at Berlin, and his lately completed theatre at Essen, to which we referred in a former number, are shown, together with his premiated design for the proposed Berlin Provincial Museum. Non-Germans are represented by Messrs. Honeyman & Keppie, of Glasgow, Herr Theyer, of Graz (Austria), and M. Baes, of Brussels. The Glasgow firm show their competition designs for the Glasgow Art Gallery and the Manchester Technical Schools competition, together with some interior decoration. Herr Theyer exhibits some façades of business premises, whilst M. Baes has contributed a collection of excellently-coloured sketches of a number of villas, boat-houses, &c., lately carried out

under his superintendence, together with a large perspective showing the proposed development of the seaside resort Knocke, northwards of Ostend. Of the other exhibits we would only mention some drawings of the extension of the Munich Town Hall, by Herr Graessel, of that city. Herr Graessel showed great ability in this very difficult and responsible piece of work, and may be congratulated on the successful result obtained.

THE competition between the capital towns of rival Swiss Cantons has always been most conspicuously shown in their public works. We have lately alluded to the unprecedented building activity of Zurich, and now we find that Bern is intent upon following its rival's example. Besides the restoration of the Cathedral by Professor Beyer, of Ulm, at a cost of over half-a-million francs, and the extensive restoration of the picturesque towers and fountains of the city under the superintendence of the energetic City Architect, the new museum is in course of erection, and according to the estimates of the architects (Messrs. Lambert and Von Rodt, of Stuttgart and Bern respectively), will cost the town at least 800,000 francs. Then Professor Auer's cleverly-planned design for a new Federal Council Hall has been practically passed by the Bern authorities, and will be carried out next year on a magnificent site between the old "Bundesrathaus" and the new Government Offices, which the same architect but lately completed at a cost of some two million francs. Among other Government buildings the newly-opened General Telegraph Office (planned by Messrs. Dorer & Fuchsli, of Baden) is to be soon followed by a University Building of some pretension, whilst church architecture is to be represented by a place of worship designed by Herr Moser, of Karlsruhe, and philanthropic work shown by further specimens of the successful blocks of artisans' dwellings lately built by the Municipality. The erection of a new Assembly Hall has to be decided on within a few months, and at the same time probably the question of having the proposed new theatre, in connexion with this block will be decided—it is to be hoped in the negative, considering how unsafe it is to place a theatre under the same roof with another building. The civil engineers of Bern are also to have plenty of work found for them. Amongst the most important works they will have charge of we must mention a proposed set of long bridges, of which one has just been completed, and a proposed city extension westward.

THE Huyett & Smith Manufacturing Company, of Detroit, Michigan, U.S.A., have introduced into England the Smith's Hot Blast Apparatus, which is a well-designed, compactly-arranged combination of engine, fan, and steam-heating chamber for the supply of fresh warmed air to the main ducts of a ventilation scheme. The engine is of vertical type, made to run at high speed, without detriment from the dust and dirt frequently found where mechanical ventilation is needed. The fan is of the axial class, and appears from the illustrations to be of fairly high efficiency. The heater is a good example of steam apparatus, with horizontal tubes, and seems well adapted to adequately warm without over-heating the air passed through it. For cases where a central warming and propelling apparatus for large masses of air at low pressure and velocity is required, this system gives every promise of satisfactory results.

AMONG the numerous new inventions in the way of bolts and latches which are brought before the public, the new one called the "lightning bolt," produced by a company who call themselves by the rather too ambitious title of "The Future Bolt Syndicate," is really ingenious and scientific, and worth special attention. It consists

essentially of a long hasp fixed on the door-frame, on a swivel attachment which allows it to hang close to the frame or casing when the bolt is out of use. To bolt the door, the hasp is turned on the swivel and shut down on a swinging catch attached to the portion of the apparatus affixed to the door, when it fastens automatically; but by an additional turn given to the catch it acts also as a clip for tightening the door if at all loose in the frame. On the door being unbolted the catch automatically adjusts itself for fastening again when required. A couple of hasps fixed on the door portion of the bolting apparatus admit of it being padlocked for additional security. Furthermore, the hasp, by an ingenious and simple arrangement, can be made to perform the function of the ordinary door-chain for a partially opened door, but with the advantage that, unlike the chain, it not merely prevents the door being opened beyond a certain point, but holds it immovable at that point; it can be adjusted for two or three different degrees of opening, and can be padlocked open, so as to leave a room securely closed with the door sufficiently open for ventilation. The working is perfectly simple; the parts are all solid, and there are no springs, and nothing that can get out of order except by actual breakage. It is difficult to convey precisely the method of action by description, or even by an illustration; but every practical man who examines the make and working of this bolt will admit that it is a really ingenious thing, the outcome of a good deal of thought and contrivance.

ADVERTING to our "Note" of the 16th instant, relative to the demolition of the chemist's shop in Southampton-street, Strand, a correspondent tells us that Messrs. J. Beedzler & Co., of "Ye Golden Key," No. 20, Norton Folgate, carry on a druggist's business there which existed *circa* 1500. At the pulling down of their premises three years ago, they found some coins of *temp.* Henry VIII., an iron mortar bearing date "1520," and, in an old cabinet, a bound volume containing, with other works, a copy of Harvey's "Two Anatomical Exercitationes concerning the Circulation of the Blood:" London, printed 1673.* Of Norton Folgate (Northern Foldgate, or Faligate), the chroniclers vouchsafe barely more than a mere mention. It has been identified with the ten acres near Bishopsgate cited in the Domesday Survey, and, if this is correct, is one of the only two places in London named therein. An extra-parochial Liberty, belonging to the Dean and Chapter of St. Paul's, it stands without the City wall, and, as Mr. Riley suggests in his "Memorials," the gate there was probably only a drawbridge over one of the wide ditches of the marsh or fen. Rose-lane, with Flower, Primrose, Blossom, and Flower-and-Dean streets, perhaps indicate a later and more pleasing aspect of the ground; whilst Spital-square, formerly Spital-yard, Norton Folgate, took its name from the Priory and Hospital of St. Mary, founded, 1197, by Walter Brune, of Rohesia, his wife, for canons regular of St. Augustine, which at its surrender, being then valued as worth 478*l.* 6*s.* 8*d.* per annum, was, as Stow writes:

"A house of such relief to the needy that there was found standing at the surrender thereof nine score beds well furnished for receipt of poor people."

The square's site is that of the priory churchyard; Steward and Duke streets were built on the priory site: on that of the hospital was the house of Sir Horatio Farraviciari, an Italian merchant and ambassador in Elizabeth's reign, in which *temp.*, James I., was lodged the ambassador of the Archduke of

* Addressed to John Riolanus the Younger, of Paris, in reply to his "Encheridium Anatomicum," Leyden, 1648. A Latin copy in the King's Library, British Museum, is dated "Rotterdam, 1649." Dr. Norman Moore, in the *National Dictionary of Biography*, says Harvey published in 1649, at Cambridge, at Roger Daniel's press, his "Exercitatio Anatomica de Circulatione Sanguinis," ad Joannem Riolanum filium Parisiensem; and that the first edition of the "De Circulatione" in English was published at the White Lion in Duck-lane, London, in 1653; and a further edition in 1673, both by R. Lowndes.

Austria. The new girls' school, in Spital-square, representing the original ward school of Bishopsgate-without, was built in 1891 by Messrs. Woodward & Co., contractors, after the designs of Messrs. T. Chatfield Clarke & Son; St. Mary's Church, originally a chapel built 1603, by Sir Geo. Wheler, Prebendary of Durham, in the square, stands close to the site of the cross where the Spital sermons were preached. Here, too, lived Bolingbroke, Pope's "St. John." As at St. Paul's, the cross had its Paternoster-row hard by.

THE old parish watch-house in Farringdon-road, Clerkenwell, has lately been pulled down. Built in 1794, it served as a watch-house for a period of twenty-nine years. When it was erected the thoroughfare was named Ray-street; in 1800 the authorities set up a pump here against the pump-house, No. 2, Ray-street (rebuilt as No. 16, Farringdon-road) with an inscription thereon saying that the pump stood four feet distant eastwards from the spring, or Clerks' Well. Twelve months ago the tenant of one of the two shops into which the house had been divided showed us the spot in the floor of his shop beneath which the water still ran, as it used to run down to the Fleet, which in its course here was once known as the River of Wells. The iron tablet and spout of the pump were fixed against the west wall of the tower of St. James's Church in 1878, close to where, as depicted in Agas's map, the spring poured forth into a stone cistern, which Stow mentions, against the outer wall of St. Mary's Covent.

WE regret much to find that Selby Abbey is again in want of repair, for which it seems very difficult to find funds. The vicar writes to the *Times* that the west front has shown signs of serious subsidence, and that it is estimated that 500*l.* will be required to carry out the necessary repairs. We hope those who have the means, and who take an interest in our great national buildings, will give some assistance in raising the sum required.

A FIRM carrying on business in Little Queen-street, Westminster, write to the papers in a very bitter spirit to complain of the inconvenience caused to them by the sudden announcement that the name of their street is to be changed, in consequence of the existence of another Little Queen-street (the one running into Holborn). Of course the inconvenience to individuals in these cases cannot be denied, but they must give way to the general good. The existence of duplicate names of streets is a constant source of trouble and misdirection of letters, and we quite approve of the action of the Council in endeavouring to reduce the number of doubles of this kind. "Atterbury-street," the proposed new name, is a very good historic Westminster name (a great improvement on the old one), and the inhabitants of the street had better make up their minds to the change.

DIOCESAN SURVEYORS.—At a meeting of the Archdeacons and Rural Deans, held at the Bishop's Palace at Wells last week, the following gentlemen were elected as Diocesan Surveyors under the Ecclesiastical Dilapidations Act of 1871, for the Diocese of Bath and Wells for a period of five years from September 15 inst., viz.:—Mr. Edwin Hippisley, of Wells; Mr. C. H. Samson, of Taunton; and Mr. C. R. Wainwright, of Shepton Mallett.

REGISTRATION OF PLUMBERS.—An unusually large number of candidates attended the examination for the National Registration of Plumbers at the Borough-road Polytechnic on Saturday last. There were, in addition to those from London, candidates from Yarmouth, Slough, Farnham, Guildford, King's Lynn, Tunbridge Wells, Northampton, Chesterfield, and numerous other places. The examiners were Messrs. Charles Hudson, J. Hume, G. Clegg, and Alderman Hind, of Stockton-on-Tees; master plumbers; and J. Howitt, C. Dean, and W. Curtis, operative plumbers. The result of the theoretical examination is deferred, but one-fifth of the candidates passed in practical plumbing.

SCULPTURE AT THE CHICAGO EXHIBITION.

THE sculpture exhibited at Chicago may be divided into two parts, the first being that portion sent in as exhibits, and placed in the Art Building or scattered about the grounds, and having no relation to the architecture of the Fair, and the second part consisting of the sculpture employed on the buildings or designed in connexion with them, and which is naturally of more interest to architects. Of course, the display by foreign nations is entirely confined to the Art Building, and would be classified under the first heading.

Certainly never before has there been such a lavish display of sculpture in connexion with architecture.

Of course, it would be impossible in any permanent material to think of sculpture on such a scale as is here introduced, but it is a fine thing to see what can be done, especially when you have a material like "staff" which renders it possible, and the Americans are certainly to be congratulated on having carried out the scheme so thoroughly. We say Americans, but perhaps this should be largely qualified, for if we look at the names of the men who have executed the sculpture we find that, although they may be of American birth, their education, with a few noteworthy exceptions, is entirely French, and more than this, their studios are in Paris, and in many cases, as in the huge "Columbian fountain," the work has been executed there. It may be said that sculptors could not do better than study in Paris, but it does not alter the fact that an American school can hardly be said to exist, except in regard to one class of work to be mentioned just now.

Of all the American exhibits, whether in the Art Building or in the grounds, the most important is undoubtedly the Columbian fountain, by Mr. Fred MacMonnies, a young American sculptor, scarcely thirty years of age, who lives in Paris, and who engaged four ateliers for the execution of this great work. It consists of a female figure, representing Columbia enthroned on a triumphal barge, guided by a figure representing "Time" at the stern, with the rudder tied to his scythe, while in the prow is "Fame" blowing a trumpet; the barge is propelled by eight standing figures, representing on one side the Arts, and on the other Science, Agriculture, Industry, and Commerce. The barge is preceded by eight sea-horses, forming a circle directly in front, and mounted by eight young men as outriders. The design of the base is circular, and is 150 ft. in diameter, while it is flanked on each side by columns 50 ft. high, surmounted by eagles, the water to the basin being furnished by a half-circle of dolphins in the rear, and by a system of jets which entirely surround the barge and figures. As showing the scale, we may mention that the smallest figure is 12 ft. high and the largest 20 ft. The feeling of the whole conception is French, but it is we think very well handled. It is of course entirely a sculptor's work, in which allegory and imagination run riot, and are practically unrestrained by any architectural conditions. The figure of Columbia has been taken exception to, as not being sufficiently dignified, but even if this were so, it is treated with a freshness which in these days is very pleasing. It may be interesting to state that the fountain cost 10,000*l.* At the other end of the great basin is a colossal statue of the Republic, 65 ft. in height, and placed on a pedestal 35 ft. high. The sculptor is Mr. Daniel C. French, of New York. (See illustrations.) This figure is designed on a very different principle to the Columbian fountain; it is emphatically an architectural figure, treated in an almost archaic manner, in order to bring it into relation with the surrounding architecture, to which it is well proportioned. The statue is gilded. Though one can see a strong family likeness to the statue of Liberty at New York, we think it is treated in many respects in a very original manner.

Immediately behind, or to the east and over the triumphal arch at the centre of the colonnade or peristyle, is the Quadriga resting on the pedestal 40 ft. square. It is by Mr. D. C. French and Mr. E. C. Porter, and represents Columbus at the triumphal fête given in his honour on returning from his first voyage. The chariot is drawn by two pairs of horses, with a woman between each pair leading them; while an outrider is placed on either side of the group and somewhat apart, forming a somewhat novel treatment.

This group really comes under our second heading of sculpture in relation to architecture,

but we have mentioned it here on account of its proximity.

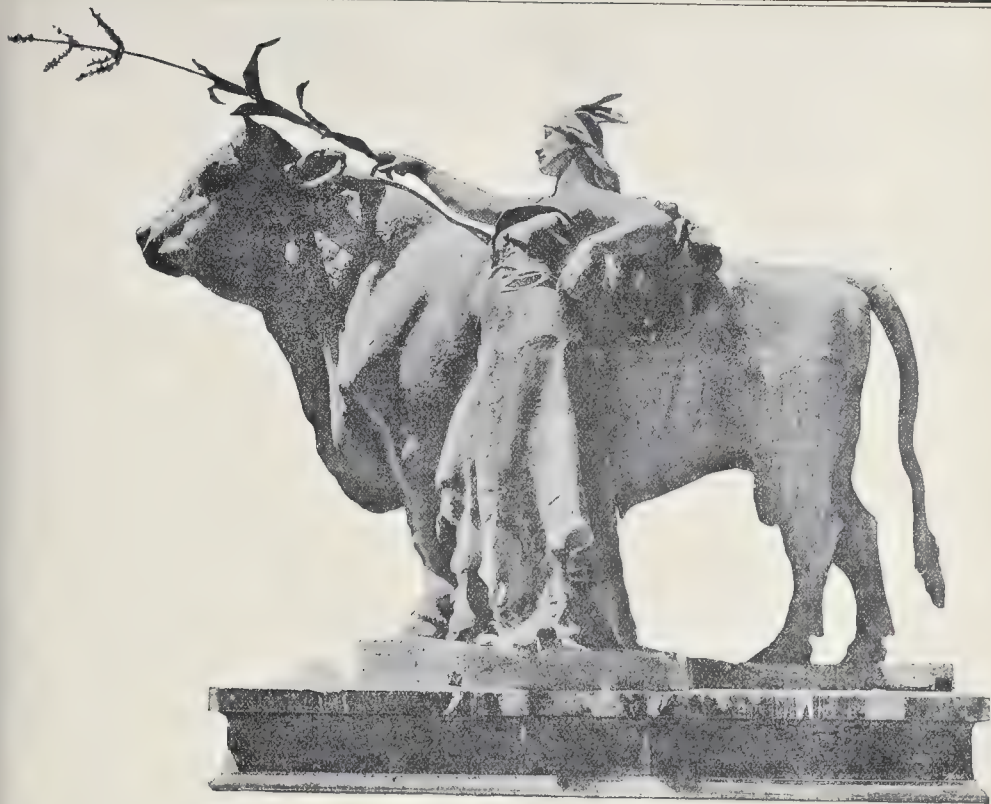
The most purely American sculpture, and therefore the most interesting in a national exhibition like this, is undoubtedly the series of native wild animals by Messrs. A. P. Proctor and Edward Kemens; these are placed in various parts of the grounds, resting on pedestals at the ends of the bridges and elsewhere. The animals modelled are the puma, the buffalo, the polar and grizzly bear, the elk, and the moose, and one can tell at once that there is new and original treatment in these. We were, therefore, not surprised to learn that Mr. Proctor has had a training which is absolutely necessary in order to produce something purely national; in other words, he has been educated in the States and has studied from Nature herself. In short, Mr. Proctor began his art career as a cow-boy on his father's ranche in the Rocky Mountains, and it was from being an energetic and appreciative cow-boy that he became an appreciative artist, ready and capable of seizing the various idiosyncrasies of the animals amongst whom he passed his life. On the lonely prairie, undisturbed by the too often absurd theories of modern art education, from loving his animals he longed to portray them in the clay; thus we find that in two of his subjects he has produced works which are considered especially fine. These are placed, curiously enough, opposite the main entrance of the Transportation Building, also carried out in so novel a manner. One is an Indian, sitting barebacked on a horse, with his left hand to his eyes, and turned partially round gazing into the distance, while the horse, evidently frightened by subtle instinct of some danger which also troubles his master, holds his head in the air with an attitude of listening. The pose of the Indian and the conception of the whole thing are very fine. Will Mr. Proctor think it worth while to cast it in bronze say 18 in. high? The other subject is a cow-boy on a broncho, and in great contrast in that, while the Indian is at perfect rest, the cow-boy is in one whirl of action restraining his wild pony. If art is to represent the manners of a country, it seems a happy inspiration to place these two subjects in an American exhibition. The cow-boy is as much the part of American Western life as the quip-player was of the Greek or the gladiator of Roman life; and if he had existed in these days he would assuredly have been depicted, but we doubt if with a purer artistic study than Mr. Proctor has bestowed on the subject. The various animals mentioned are treated with equally fresh feeling.

In the Fine Art Building, American sculptors, more or less under the influence of foreign schools, have made a good show; there again, when treating of subjects of the Old World, they often fail, and not unnaturally. For example, the number of "Lady Godivas" scattered about the hall in every posture is considerable, and yet in not one of these is there the feeling or refinement we should like to see expressed; and it is to such groups as the "Buffalo Hunt," by Mr. Bush Brown, in which a semi-nude Indian on horseback is plunging an arrow into a buffalo, who is in the act of tossing his horse, that we see expressed something which is of necessity American—a phase in American Western life, treated with all the force and boldness of one who knows his subject. Of course, there are exceptions, as in Mr. Elwell's "Dickens and Little Nell," a very poetic conception, which we are sorry the London County Council could not see their way to accept for the adornment of London. Mr. W. O. Partridge's "Shakespeare" is also an exception, and is full of thought; but as the Americans study, and even revere, Shakespeare more than we do, this was in some measure natural.

Among some of the more notable exhibits are Mr. Dallin's "Signal of Peace," in which an Indian is sitting a horse barebacked, with his spear resting on his horse's back, carrying the flag of truce; in this, however, French influence is very apparent.

Mr. Tilden's life-size "Indian Bear Hunt" is a fine monumental group; so also is "The Closing Era," by Mr. Preston Powers, of Denver, and formerly of Florence, which represents an American Indian gazing upon a dying bison, and apparently realising that his own race, like that of the bison, is rapidly passing away. The group, it is said, was named by the poet Whitier, and is very boldly executed; the life-size bison, with full shaggy mane, is stretched on the ground, while the Indian, with foot on back and bow in the right hand, gazes intently at the creature.

Mr. Gelert's "Struggle for Work," in which an old man and a boy are trying to snatch a work-



Group from the Agricultural Building, Chicago Exhibition.—Mr. Philip Martiny, Sculptor.

ticket from a man holding it aloft, is very expressive. Several full-size portrait statues and busts follow, and one especially to be noted is that of Abraham Lincoln in an easy attitude in an arm-chair, and full of thought.

Mr. D. C. French's "Angel of Death and the Sculptor," is a fine idealistic composition, and was executed in memory of a promising young sculptor lately deceased, and represents the Angel of Death taking him just at the completion of some great work which would render him famous.

The sculpture on the great buildings, which forms the second part of our subject, is, from an architectural point of view, of course, more interesting than these isolated pieces of the sculptor's art, and a few remarks about the more important groups will be advisable, and we have already slightly touched on some groups, and will therefore endeavour to confine our remarks to others. The Administration Building and the Agricultural Building are undoubtedly the most important on the ground, and are perfect architectural dreams, in so far as the connexion of the architecture and sculpture is concerned, the lavishness with which it has been carried out, and the impossibility of ever seeing a building executed in such a manner in a lasting material on account of the enormous expense. Mr. Karl Bitter, of New York, is the sculptor. The most important groups are those placed on either side of the four entrances, standing 34 ft. in height, and representing the four elements, Fire, Water, Air, and Earth, treated in their natural unsubdued condition on one side of the entrance, and on the other in the service of man, and controlled by him. Of course, these are all allegorically treated, and naturally proceed on French lines, probably being slightly rougher and bolder in general execution. A good deal of this vigour would naturally be lost if the work were executed in stone. We may, perhaps, shortly describe the allegory of one of these, and it will then be understood on what lines the rest proceed.

In representing "Fire," Mr. Bitter has shown the uncontrolled element by a female figure pushing forward, holding a snake in her out-

stretched right hand; she is resting on the form of a man, who, with full sensuous face, represents the storm, while beneath crouches the figure of a woman with a malicious expression secretly trying to set fire to a pile of wood. On the other side of the doorway is a figure of Genius lifting a torch as a symbol of light, the best gift rendered to us by fire, while a smith who has stricken a demon, with his hammer, to the feet of Genius, is intended to represent the usefulness of fire to man's daily usage.

The other great groups are treated similarly on the four wings containing the administration offices; and supporting the dome are twelve groups, three to each wing. These are on a much smaller scale and allegorise Strength, Patriotism, Charity, &c., while in the highest point at the sides of the four smaller domes are eight more groups allegorising the extreme culminating points of Human Culture, as Art, Science, Industry, and Commerce; War, Peace, Theology, and Justice.

In these groups, removed as they are from the eye, more consideration was naturally paid to decorative effect than accurate representation of any theme, and these groups, with outspread wings, form at this point, where it is needed, a sharp contrast with the severity of the architectural lines. The winged bas-reliefs in the interior have been already mentioned. The scheme of architectural sculpture on this building has been carefully considered by the architect and sculptor, and in consequence we have a result in which the one harmonises so well with the other.

The Agricultural Building approaches very closely the Administration Building in the profusion of its sculpture. Mr. Philip Martiny, of Philadelphia, has contributed most of the sculpture work. In this building we jump at once from the allegory of the Administration Building to realism. A great deal of the decorative work finds its *motif*, as was natural, in subjects relating to agriculture, such as the maize, potato, and tobacco plant, while the great frieze contains the turkey, the representative wild bird of America. The building has apparently been designed for a

rich display of sculpture, the massive piers which occur along the façades lend themselves naturally to the supporting of large groups.

Each of the four corner positions has its dome surmounted with statuary, consisting of a group of four female figures representing the four principal races of men (see illustrations) supporting a large globe, and grouping very pleasingly with the architecture, while groups of statuary, 20 ft. square, representing "Ceres" and the four seasons, occur over the piers already mentioned, and are succeeded by boldly treated with oxen, horses, and figures, and are well seen from the ground. On a smaller scale are Mr. Martiny's signs of the Zodiac and his figures of abundance. A draped woman holding sheaves of corn over the main entrance is the pediment by Mr. Larkin J. Mead, with Ceres as a central figure.

From the massing of these groups at well-defined points, perhaps this building appears even richer than the Administration Building, and is certainly an object-lesson in the value of contrast.

The Machinery Building is treated more sparingly of sculpture. Having passed Allegory and Realism in the two previous buildings, we here find Portraiture introduced. Mr. A. Waagen, the sculptor, has placed figures over the northern apsidal entrance bearing shields containing portraits of eminent inventors of machinery, while in the pediment to the Eastern entrance (see illustration), around the figure of Columbia are grouped inventors of machinery and the members of an examining jury, the two lower corners being filled by groups of lions representing brute force subdued by human genius, represented by two children. Other figure subjects occur on the roof, while the architectural sculpture proper, which is Spanish Renaissance in feeling, is very richly carried out.

The sculpture to the other buildings is not so elaborate, that to the Electricity Building consisting principally of a very fine statue of Benjamin Franklin, in which he is represented grasping with one hand his kite, which rests upon the ground, while the other holds aloft the key which was to act as conductor.

The Fisheries Building is very interesting on account of the architectural modelling with which it is overlaid. The building is in the Romanesque style, as already mentioned. Mr. Cobb's method of procedure is noteworthy: he first drew the outline of his capital from an old Romanesque cap, and then took his drawing down to his sculptors, and worked into this outline such subjects as frogs, fish, dolphins, and other sea subjects, and thus produced a variety which could be easily cast in plaster and which is duplicated, but not too often, throughout the building and treated in a purely naturalistic way. There are hundreds of capitals in the design, and they are specially numerous in the connecting arcades* on either side of the main feature, and the style of the whole building is very pure, while at the same time novel in treatment.

Throughout the Exhibition, perhaps in no one case is the sculpture overdone, and that is in the peristyle at the eastern end of the great Court of Honour. It will be remembered that this is four columns deep, and on the balustrade on each face and over each column is a statue by Mr. Theodore Baur, 14 ft. high, representing Eloquence, Music, Navigation, &c., many times duplicated. As there are forty-eight columns on each façade, and above each is a figure, the effect would be right perhaps if they were placed only on one façade, but the whole peristyle being of such comparatively small depth, the upper part of the statues on the side farthest from the spectator can be seen, and produces a somewhat overlaid and muddled effect.

The two allegorical subjects on either side of the triumphal arch in the centre of the composition represent Navigation and Discovery (two very appropriate subjects to adorn a triumphal arch dedicated to Columbus), and are by Miss Bela Pratt, of New York, both being executed with boldness.

Enough has been said to show in what direction the methods of sculpture have been carried out. In no previous Exhibition certainly has the work been done with such thoroughness and *bon accord* between architect and sculptor, and if it succeeds in bringing the two more thoroughly in touch in the future great buildings of America it will have done a great deal for architecture. Of course, as in the decorative art, if less had been done, it might have been executed more thoroughly, but we must be thankful that the Americans have not been frightened by the magnitude of the work; but that both architect and sculptor have combined to make their work that, which architecture without sculpture can never be, a work of art in the highest and noblest degree.

The French have undoubtedly sent a very fine collection of sculpture. This was almost to be expected in an exhibition held in a country in which French art is so much studied and admired as in America, although in the painting section the French seem to have made no special effort.

The numbering of the objects is very badly managed; each bears two numbers, the official number and the number in the section of the country to which it belongs, which is confusing because not sufficient distinction is shown in the lettering, an arrangement far inferior to that which was adopted at Paris, besides which the sculpture of the different countries is intermixed to fit the spaces, and it is only by the colour of the pedestals that the country is ascertained. Taken generally there is considerably more refinement shown than in the American section, but we must say that it is often at the expense of the vigour and "go" which is visible in the latter section. There are 241 subjects to the 148 of the American section, but this number includes a large collection of historic sculpture sent by the Bureau des Monuments Historiques, by deducting which we find that the numbers are nearly equal. There are several large groups, amongst which may be mentioned:—"In Danger," by M. Houssin, a woman with two children in her arms, and gazing with troubled countenance into the distance. M. Gustave Michel's "Blind Man and the Paralytic," powerfully executed as to form and expression, in which the blind man gazes listlessly in front of him, and supports on his shoulders an older man, representing a paralytic. The whole composition is full of the softer and more refined traditions of the French school.

In the animal groups, as in M. Cain's "Rhinoceros attacked by Tigers," despite their ability, we do not see the same life as evinced by American sculptors. In some of the smaller works we see the particular direction in which the great skill of the French shows itself. For

instance, M. Beguine's "Charmer" is a young nude woman, beautifully modelled, holding in her outstretched hands two horns, whose ends are in her mouth. There is a brightness and play of fancy without vulgarity in the figure which is particularly charming. The "Bacchante" of Moreau-Vauthier is a *tour de force* in the matter of form, and shows what masters in technique the French are, and what a thorough grounding in the study of the human figure is at the bottom of their educational system. From the point of view of expression there are some very noteworthy examples. M. Mariotton's "Chactas," with blank despair depicted on his countenance, is well portrayed; while "The Conqueror," by M. Sanson, is finely and originally treated: it shows a nude man looking boldly in front of him, with proud mien, and holding in his right hand a short sword, which rests on his shoulder, while with the left he points disdainfully to his victim on the ground. It is in idealistic subjects such as these that the French are so successful.

The "Phryné" by M. Hannaux and the "Diana" by M. Lombard are finely-executed statues of the nude, in which the delicacy of form and limb are as carefully handled as in any Greek work.

M. Bartholdi (of Statue of Liberty fame) is represented by his "Washington and Lafayette," a colossal statue of the meeting of these two generals; it might look well on the top of a lofty pedestal, but as seen on a level with the eye is extremely coarse. This is, of course, the mistake of all sculpture shows in regard to works of any size, that one is unable to judge of their effect when placed *in situ*, which is the very view one must obtain before one can pass an opinion on them.

Portrait busts are very few in number, the French section offering a great contrast in this respect with the English and American sections. Perhaps the most noteworthy is that of M. Patenotre, the French Ambassador to the United States. Other small figure-subjects are sent in some numbers. Amongst the most pleasing are some by M. Hector Lemaire, and one in particular is his treatment of the "Eclipse of the Moon," in which a woman is treated, in an idealistic manner, with all the life, character, and piquancy of the best French work; it is sufficiently small for a mantelpiece, and is, in fact, an example of the work we are so much in want of in England, and which, brought within reasonable bounds in regard to expense, would compete with what we may call the commercial figure-subjects with which we are deluged, and would do much to raise the level of taste of the great middle classes of England.

Besides the modern work is the fine collection sent by the "Bureau des Monuments Historiques," which will belong to Chicago at the close of the Exhibition. The collection consists of large replicas in plaster, from historic French buildings, from the eleventh to the fifteenth centuries.

There are over 150 of these, and some are of immense size, standing in the middle of the Court. Amongst others is a portion of the west façade of Amiens Cathedral, a doorway from Notre Dame, Paris, and like portions from Rheims, Rouen, Sens, Chartres, Gailien, and Limoges, besides reproductions from the work of Jean Goujon, Lehoucq, Masson, Michel Colombe, and others, forming altogether a collection of which France may well be proud, and which, sown on soil apparently so susceptible as that of America, should show good results.

The Germans are not so strong in sculpture as in the painting section, and one is at once struck with their inferiority of perception as to the true artistic value of sculpture, and also in technique, as compared with the French. There are no very large groups, and the subjects consist mainly of tamely-handled figures, representing such subjects as Sleep, &c. Of course, there are exceptions, to which these remarks do not apply, but we are now speaking in a general way, and of the general effect produced on us. A great many of what we may call the "patriotic" statues, are lent by the National Gallery at Berlin, and show us the three latest Emperors in various attitudes, and of which one is apt to tire, especially as they are executed with no more than ordinary ability.

In coming to Italy, we notice at once a considerable difference in treatment and execution. The size of the subjects is generally smaller, and the absence of the nude is at once apparent. There is a considerable display, two large rooms being filled. In the circular dome-covered hall are four statues, 5 ft. high, allegorical of Europe, Asia, Africa and America, treated in a very feeble manner, and with the other attempts in this gallery, tend to show that the Italian School is unable to idealise any subject. The Italians,

however, execute to perfection such subjects as portraits of peasant girls and such-like subjects of domestic and home-like nature, but seem unable to rise into the higher realms of sculpture. The collection consists principally of portrait-busts and figures of women in costume, in some cases approaching very closely to what we may call commercial sculpture; and we have still the old worn-out *tour de force* of veiled faces, a piece of trickery which the Italians seem to delight in. The Italian eschews the nude, perhaps because he finds the Italian nation will not buy it, but he revels in such subjects on a small scale as should please the "British matron," such as flower-girls, fruit-sellers, gipsies, fisher-boys, and the like, many of which we must say are treated with much skill, although, perhaps, they certainly do not rise into the higher domains of art. Besides these, there is also a fine collection of bronzes from ancient portrait-busts, and also candelabra, &c., an important branch of the sculptor's art not to be found in the art gallery, as it should be, but tacking its place amid the commercialism of the Manufactures Building.

England, it must be confessed, makes a very poor show in sculpture. There are fifty-three subjects, which consist largely of portrait busts. Amongst others, Sir F. Leighton, Mr. G. F. Watts, Mr. T. Woolner, Mr. Hamo Thornycroft, Mr. Onslow Ford, Mr. Nelson Maclean, and Mr. Harry Bates contribute small subjects, but neither in technique nor in other respects do they make much show by the side of France, and one is inclined to think, in conjunction with the German exhibit, that the Teutonic races can never found a sculpture school. It is true that Mr. Gilbert seems a notable exception; but he does not contribute. In comparison with others, it seems as if that the sculptors have a great deal to go through before they can bring their school up to the level which the English school of painting occupies, and it really appears that one of the first things is to learn to model, and this is only to be done by a much more severe training in the construction and setting-up of the human figure, which is certainly the foundation of all true art, and especially of that part which we call sculpture.

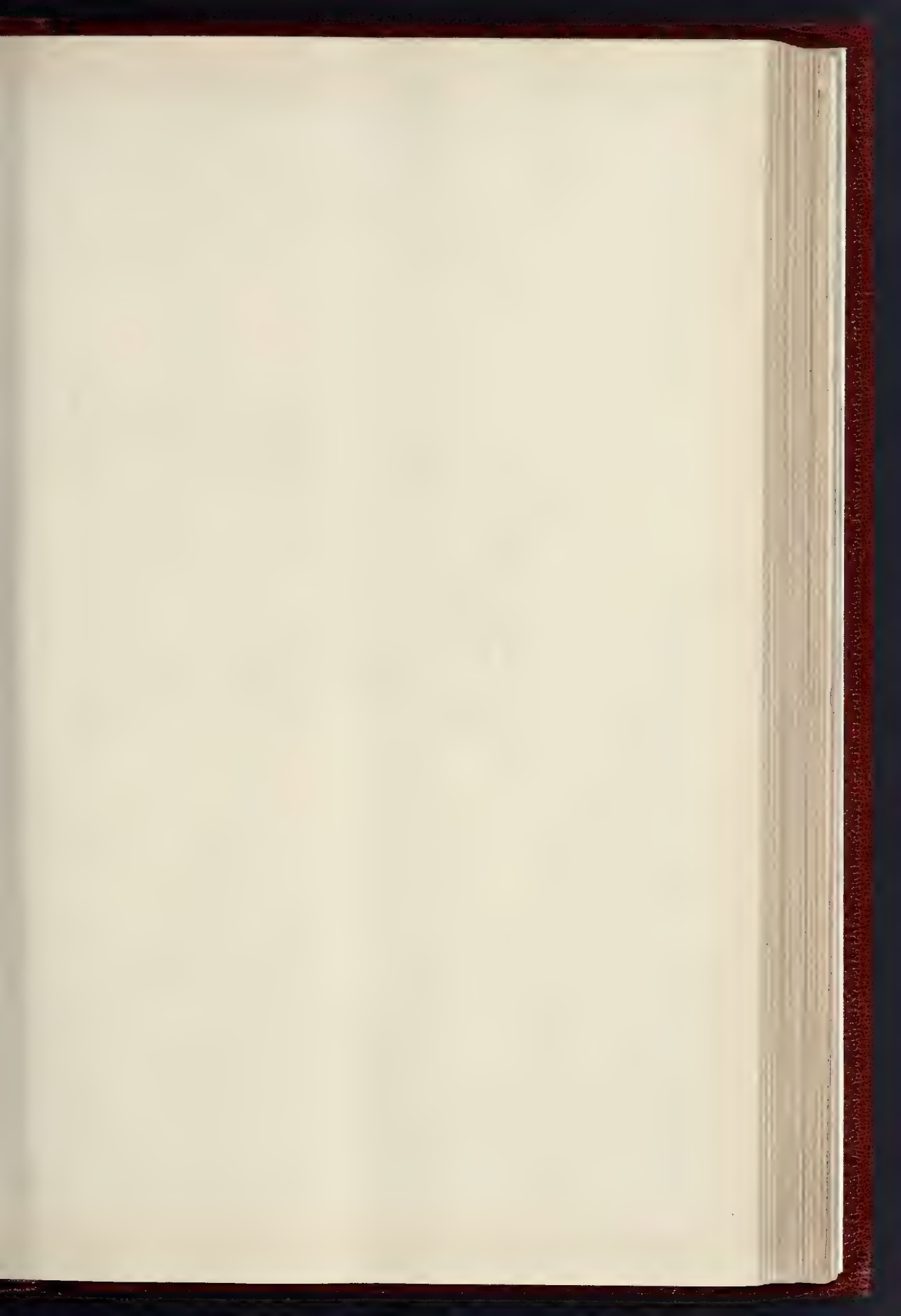
COMPETITIONS.

PROPOSED TECHNICAL BUILDINGS AT REIDGATE.—Meetings of the Technical Education Committee for the Borough of Reigate and District were held at the Market Hall, Reigate, last week, to receive and consider the Building Committee's report upon the five sets of designs for the proposed Technical Buildings sent in by local architects in pursuance of the invitation of the Committee. After considerable discussion the plan marked "Quantum," by Messrs. Baker & Penfold, was selected as the best, and the Building Committee had no hesitation in recommending that plan as the one for their adoption. A formal letter from Messrs. Baker & Penfold giving their opinion that the design could be carried out within the limit of cost laid down (£3,500) was read.

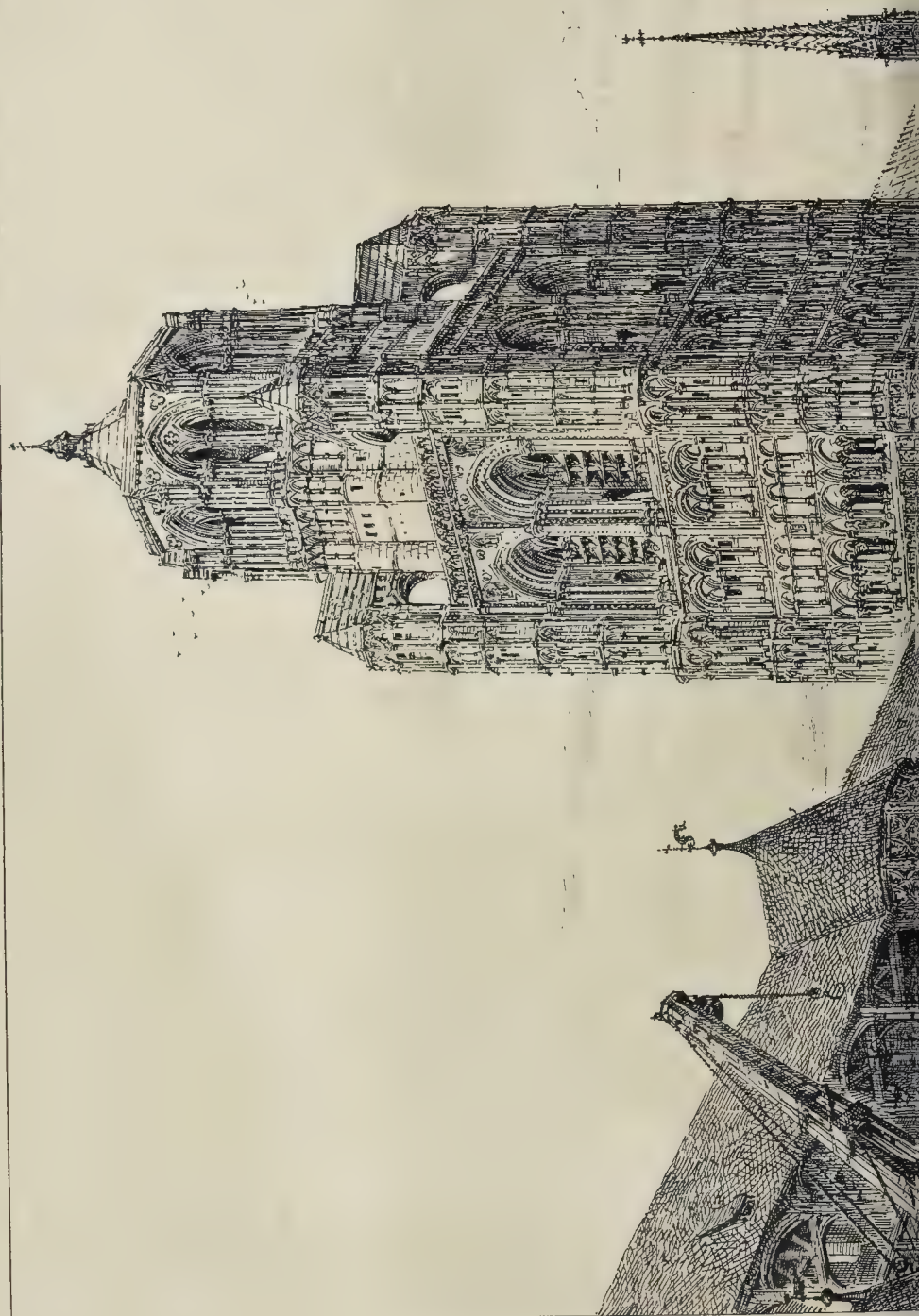
ARCHÆOLOGICAL SOCIETIES.

DURHAM ARCHÆOLOGICAL SOCIETY.—From the *Newcastle Leader* we learn that the 50th meeting in 1893 of the Archæological and Architectural Society of Durham and Northumberland was held on the 22nd, the members driving from Durham to Sacriston Heugh, Chester-le-Street and Lumley Castle. At Sacriston the party visited the old Grange of the Sacristy of the monastery of Durham, of which considerable and interesting remains exist. On reaching Chester-le-Street, the site of the bishopric previous to the foundation of Durham, the party proceeded to the church, where Canon Greenwell gave a address on the history of the building, which, he said, was placed within a Roman camp of very considerable size, about the same size as the camp of Lanchester. He thought there were no remains of the ditch or walls of the camp left, but excavations had traced it out sufficiently to show that the camp occupied about six acres, a much larger camp than most of the similar camps in the North of England. It was upon one of the great Roman roads, off the line of Watling Street, which ran by Binstocher, Lanchester, and Elcheater to Corbridge. Chester-le-Street Camp was on another line of road, running to the mouth of the Tyne, towards South Shields. The name Chester was from the camp. The first thing they knew about Chester-le-Street was that the congregation of St. Cuthbert settled there in 882, when fleeing from Lindisfarne Island because of

* See *Builder* August 19, p. 133.



THE BUILDER, SEPTEMBER 30 1893.

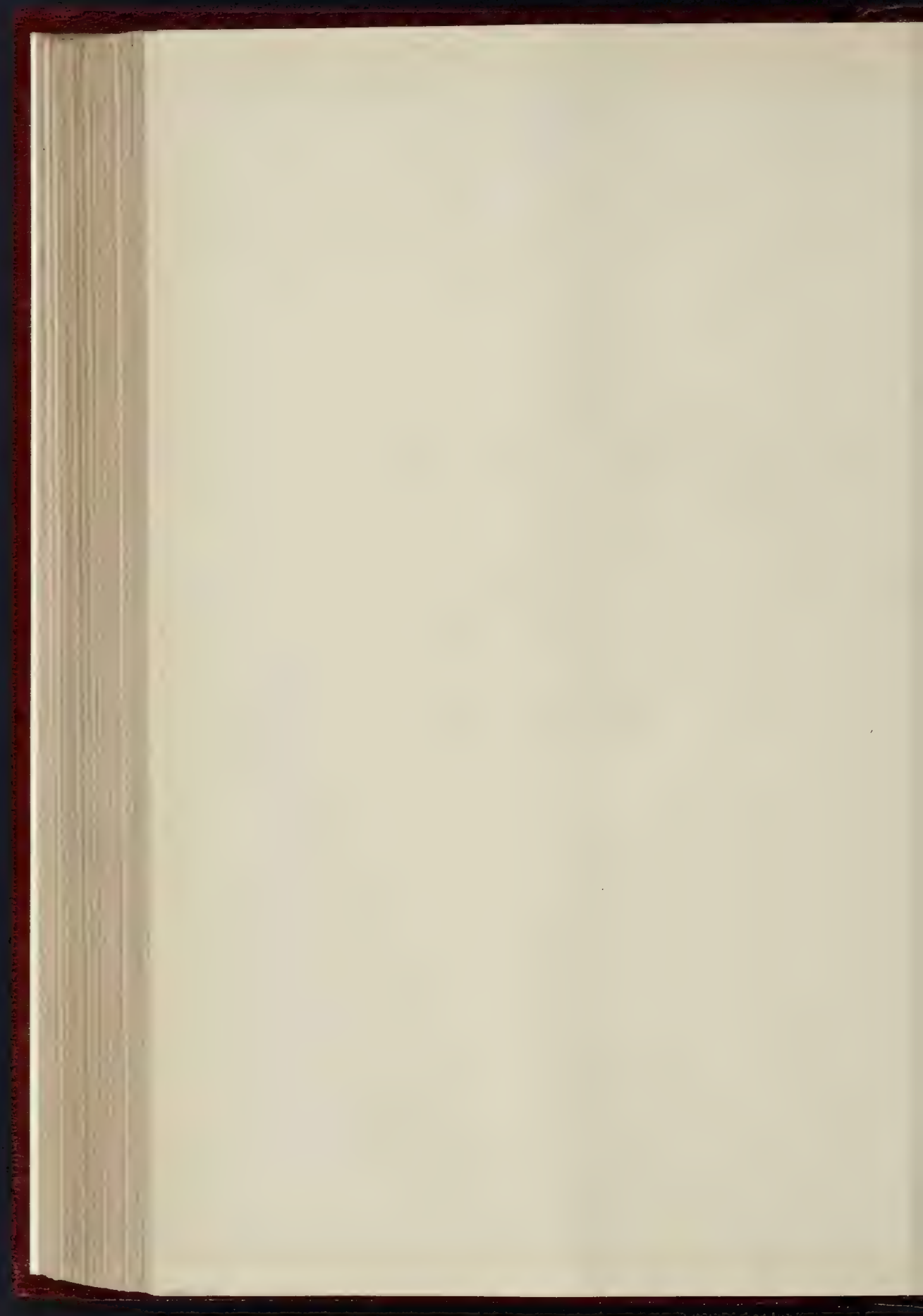




AN ANCIENT HARBOUR.

J.W. Brewer. 1892

PHOTO. 11" x 10" BRASS 3 C. 4 1/2 x 1 1/2" HARDING STREET LONDON E.C.



the Danish incursion. The reason they settled at Chester was that it was quite likely, almost certain, that the great remains of the old Roman station were still left; probably the surrounding walls would be in more or less good condition, possibly very little injured at all. The remains of buildings of very considerable size would be left upon the site, and would form a very convenient place for the congregation to occupy in room of Lindisfarne. The first church put up at Chester-le-Street was a wooden one, and it remained till the time of Bishop Egelric, who made the stone church at Chester-le-Street, and spent a good deal of money in doing good works in other places. Of the old wooden church replaced by the stone one there was not the least trace. Mr. Hodges, explaining the architecture of the church, said that the wooden church was supplanted by a stone church. That was all the history they had. In almost all the old churches some fragments of the original Saxon structure still existed. An examination of the ground-plan of Chester-le-Street church showed at a glance it was impossible that the church could have been all laid down at one time. It had grown up bit by bit. It consisted of a long nave and long chancel. It had no transepts. It had a western tower, entirely within the church. All that was the typical or normal plan of the church. There were two or three additions. This somewhat complicated plan could not have been laid down all at once. A remarkable feature in the church was the extraordinary nature of the column at the end of the third bay in the nave. If the church had been put down all at one time and the architecture all of one date from end to end that column could not have been put in for any reason whatever. The explanation was that the two western bays of the nave were the lengthening of the church westward to what it was originally. He carefully examined it a year or two ago, and it was then he fully understood, as he had not understood before, the plan of the church. The three eastern bays of the nave, as far as the double column, represented the nave of Egelric's church, and the plan of the present church represented the plan of Egelric's church. A certain portion of that church was still standing above ground in the south wall of the chancel. That explained the whole ground-plan of the church, and all the peculiarities and difficulties of plan died away as soon as they accepted that theory.

Illustrations.

AN ANCIENT HARBOUR.

AT the present time there does not exist, as far as I am aware, any Mediæval harbour which retains all its ancient characteristics. It is true that at Lubeck, at Rochelle, St. Malo, &c., portions, or indications of the ancient arrangement may be traced; but, owing to the greatly increased size and importance of vessels of every description, the necessities of modern commerce have swept away most of the erections which rendered the Mediæval ports so highly picturesque. From ancient drawings and pictures, however, those in the *Norwich Chronicle*, for instance, and the "De Leone Belgico," Somern and avestein's "Brabantia," we are enabled to store on paper some of the picturesque arrangements of an ancient harbour. One of the most striking features must have been the single or double archway upon which the ramparts of the town were carried across the mouth of the harbour. As a rule there would appear to have been two arches with projecting turret between them; its outer face and that of the ramparts themselves were defended by battlements and loopholes, but the inner face presented the appearance of an open gallery of timber, covered with a slate or roof. The object of this treatment is obvious: by any chance this important defensive work into the hands of the enemy, it was impossible for him to use it against citizens or the harbour itself. In close proximity to this fortified entrance, and generally within it, were the water-gate and the great lifting-crane. Good examples of the latter structure exist in some of our English towns, notably Norwich and Sandwich, and at Aldernach on the Rhine is a fine example of a Mediæval crane mounted upon its round tower. A very striking and picturesque one was destroyed a few years ago at Bamberg, which was post-and-pan work.

The great warehouses and bonding warehouses which surrounded the harbour were themselves fortified, loop-holed, and machicolated. The great tower of the principal church generally overlooked the harbour, and was, as a rule, so solidly constructed, that it was capable of serving as a kind of castle, or a place that could be defended as a last resource. Probably also these great lofty church towers, such as we see in Holland and Belgium and round the English coast, were used for purposes of signalling. The people in the Middle Ages were eminently practical in their ideas, and knew well how to make their buildings serve two, and sometimes three, different purposes; the covered galleries which form such interesting features attached to the ramparts of old German towns are, where they still exist, now used as rope-walks, and I should think it is extremely probable that this was frequently their ancient use in times of peace. I should mention, in conclusion, that the drawing which accompanies this article does not represent any particular place, but is purely a composition.

H. W. E.

VISITORS' STAIRCASE, AVERY HILL.

THE "Visitors' Staircase" at Avery Hill is constructed in English oak, as also the panelling of the corridor leading to it. The spandrels to the arches on ground and first floors are richly carved; the wall above the dado is lined with Tynecastle tapestry, decorated in gold.

The ceiling was modelled from special designs by the architect, and executed in plaster.

The work was executed by the building contractor, Mr. J. T. Chappell, the panelling to the corridor by Messrs. Smees & Co. Bay.

The drawing was exhibited at the last Royal Academy Exhibition.

STABLES, KING'S WALDEN, HERTS.

THESE stables have been erected for Mr. T. F. Harrison, in place of those recently pulled down, and are situated within the park.

They consist of a stable of eight stalls and two loose boxes, a visitors' stable of four stalls, and a third stable of five hunting-boxes, a large and small carriage-house, horse-washing, harness-cleaning, and saddle-room, and sick-horse box, etc., etc. On the west side of the archway leading into the courtyard, there is a cottage for the head coachman; also a messroom and bedrooms for the grooms, with ample loft space for hay and straw.

The buildings are faced with red bricks supplied by the Rowlands Castle Brick Company, near Portsmouth, the stone dressings being from Messrs. Trask & Son's Doulting Quarries. The roofs are covered with green slates, with red ridging tiles, and the whole of the stable fittings and paving has been executed by the St. Pancras Ironwork Company.

Mr. W. J. Adcock, of Dover, is the contractor, and the architects are Messrs. Beeston & Burmester, of London.

The drawings were exhibited in the Royal Academy Exhibition.

SCULPTURE AT THE CHICAGO EXHIBITION.

THESE are a few examples, reproduced from photographs, of the sculpture which has been so profusely used in the decoration of the Exhibition buildings at Chicago. They are referred to and commented on in the article on the subject on another page.

CARLISLE ARCHITECTURAL, ENGINEERING, AND SURVEYING ASSOCIATION.—The annual meeting of this Association was held in the Town Hall on the 20th inst. The officers for the ensuing session were elected as follows:—President, Mr. H. H. Higginson, M.S.A.; vice-presidents, Mr. C. Lonsdale and Mr. P. F. Ruthven; committee, Messrs. R. Calderwood (past president), C. W. Hill, A. W. Johnson, and F. J. Nickols; hon. treasurer, Mr. E. B. Newton; hon. secretary, Mr. J. R. Dixon, City Surveyor's office.

ORDNANCE SURVEY OF DUMFRIESHIRE AND KIRKCUDBRIGHTSHIRE.—The results of the new Ordnance Survey of the burgh of Dumfries will shortly be published. The town has been surveyed on a large scale, an inch to about 46 ft., and, including Maxwellton, the charts will occupy twenty sheets. The survey of the counties of Dumfries and Kirkcubright has also been practically completed. The country districts are surveyed on a scale of 25 in. to the mile, and each sheet will deal with an area of 600 acres. Numerous additions have been made to the moats formerly indicated, these discoveries being chiefly due to Mr. O'Brien, an officer of the Survey.

ANCIENT CROSSES IN THE ISLE OF MAN.

THESE ancient crosses are apparently the work of one maker, of the name of Gaut. His name, that of his father and of his home, the names of contemporaries and of patrons, remain authentic from a period of the history of the little Kingdom of Man, from which few other authentic names survive, and the crosses that he made are also among the few substantial survivals of that far-away time.

The name of Gaut occurs on two of the Manx crosses. The inscription on a cross at Kirk Michael is, that "Bridson, the smith, the son of Athacan, raised this cross for his own soul and of his faithful friend, Gaut, who made it, and all in Man." On another cross at Kirk Andreas it is stated that "Gaut, the son of Biarn of Cooley, made it."

Of the locality of Cooley little can be determined. "Cooley," which is Manx, is in English the place of a dwelling that is "hidden" from the wayfarer among hollows in the land. There are many Cooleys in the island. The relation of Gaut and Bridson which the cross of Bridson indicates suggests that the home of Gaut may be found in the district where Bridson's Cross now stands.

On a terrace in the hills above Kirk Michael is the little farm of Balla Cooley. The dwelling-house is unchanged from the style of house which prevailed in the island three centuries ago. A roof of thatch covers its low solid walls. One wall contains the doorway, the opposite wall the small openings which light its small interior. The house is not without dignity, and it is almost grim in its great simplicity of art. From this place the whole north of the island may be seen stretching out level and blue into the blue sea and sky. Within the palpitating blue of this plain are the abiding settlements of the people, and among them are to be found the crosses which are to be considered the work of Gaut. Higher in the blue are the clear forms of the countries of Scotland and Ireland. Twenty miles away, the southern part of the island is in most outward things similar to the north, but the work of Gaut does not extend there.

Over the hills, about three hours' walk, on the eastern coast, is a small district where are crosses which differ largely from those in the north. Sentiment would indicate them to be of earlier and of independent origin. There the crosses are in pairs, in the north this would seem to be not so. The stones have the form of a circular head on a narrower shaft. In the north they are rectangular and oblong. They are carved on one face only, and on the other are rough as when broken from the quarry; in the north they are carved on both faces and polished. The pattern where it occurs is of no motive but linear. In the north the pattern has almost always evidence of and reference to motives and inspiration from things real or imagined outside its own limits.

There is common to the crosses of both east and north the conception and treatment as of a painter's. There is common also in all the ornamentation, taking the design on each cross as a whole, evidence of a feeling for rightness of structure which seems personal in its origin. The arrangements at the feet of the Onchan cross and of Olaf's cross at Kirk Michael, and the position of the smaller cross on the slab of Olaf's cross at Kirk Ballaugh, are examples of conscious perception and deliberate aim with regard to the mass of the design.

Nowhere in the island is there a cross which is conceived independently as a cross. Seen from a little distance they are long, narrow slabs of blue stones. Always, with the exception of Thorlaf Neacil's Cross at Kirk Braddan, the cross, in relief about half an inch, extends over the surface of the slab and terminates usually at the foot in no definite design, but passes into the ground. The crossing is usually surrounded by a nimbus. The great length of shaft on the northern crosses does not occur in the east. In the east, where the Greek form of cross is used, it is with a feeling for its deficiency in this respect, so that the cross is supplemented underneath by an otherwise independent extension of pattern down the shaft of the slab. In all cases the patterns are carved on the cross itself, and on the spaces between the cross and the edges of the slab, and sometimes on the sides of the slab. In the spandrels and on the sides of the slabs are cut the inscriptions, where they occur, and the figures and animals sometimes added for the enrichment of the slab. The patterns, almost always extending continuously over these parts, are cut with a sharp chisel, whose marks remain fresh and distinct. The



Fig. 1.

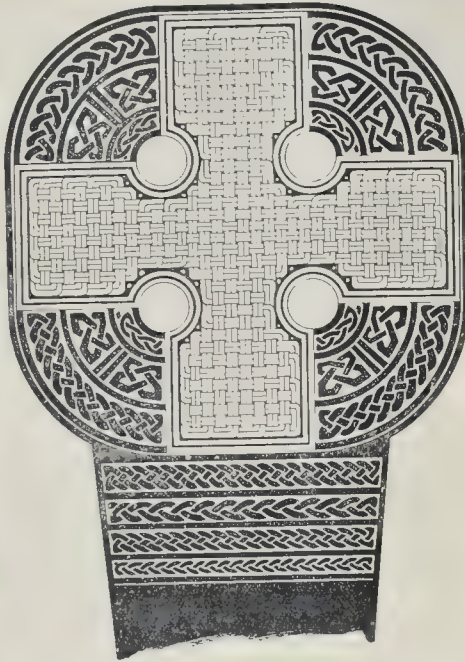


Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.

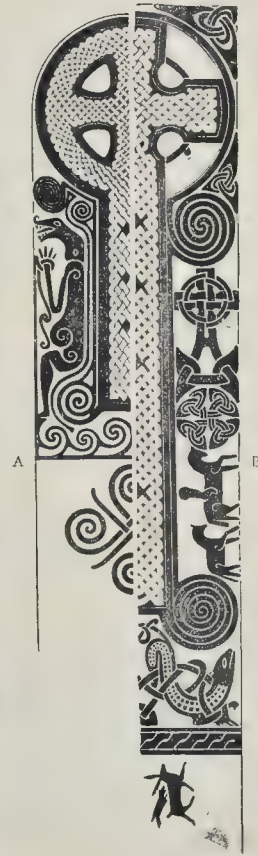
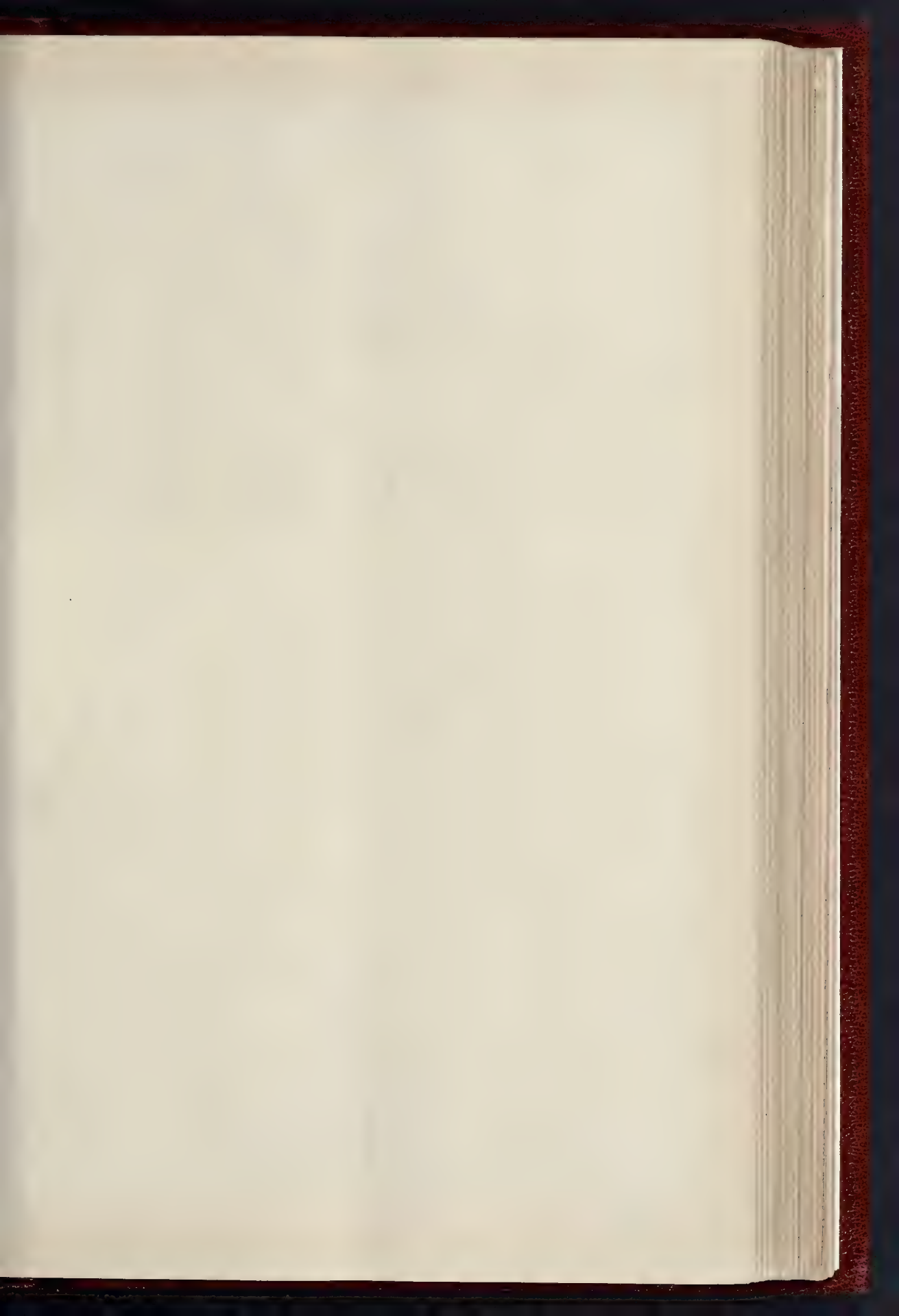


Fig. 6.

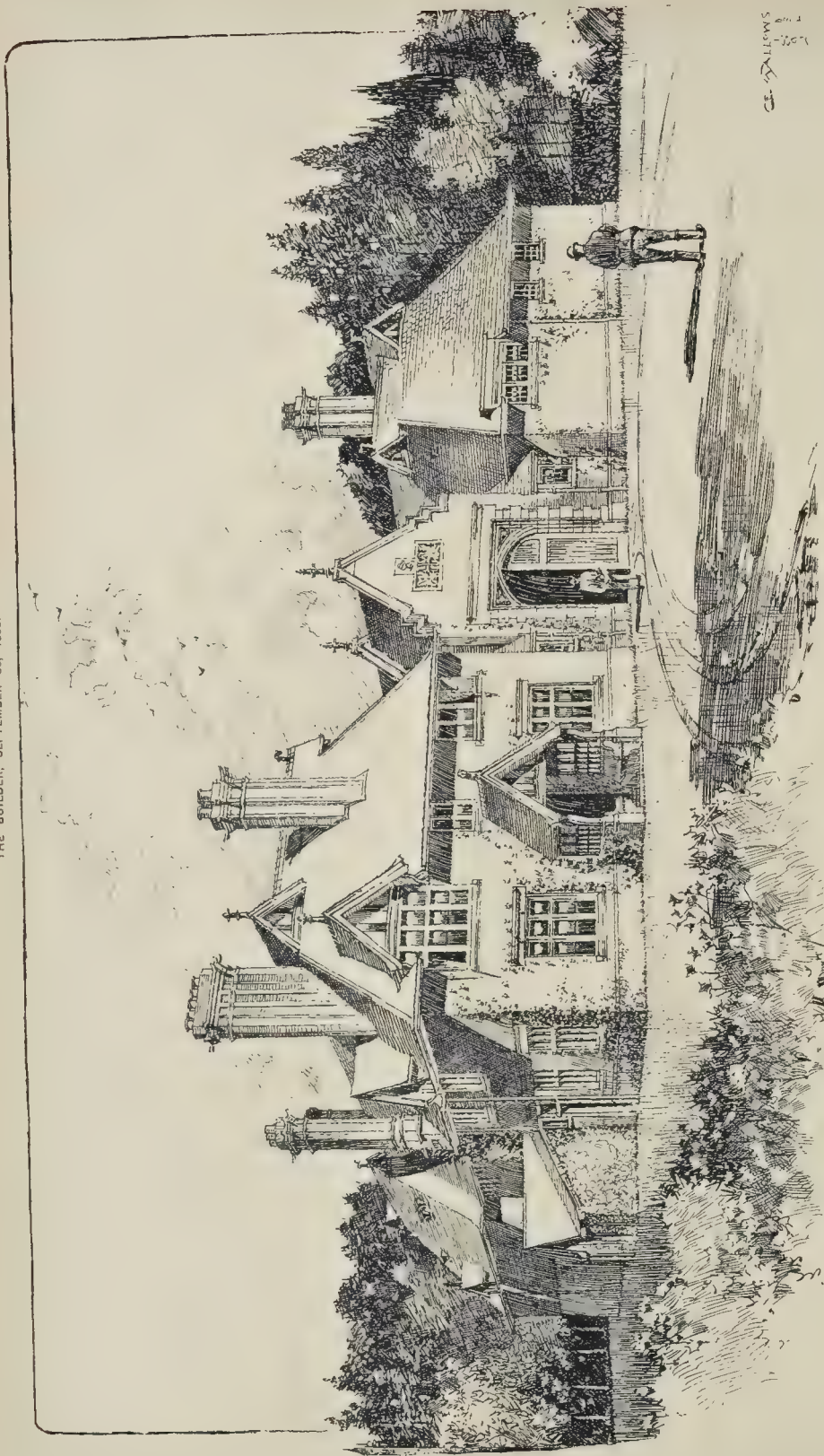


Fig. 7.

As laid Crosses in the P.L. of Man. Drawn by Mr. Archibald Knox.

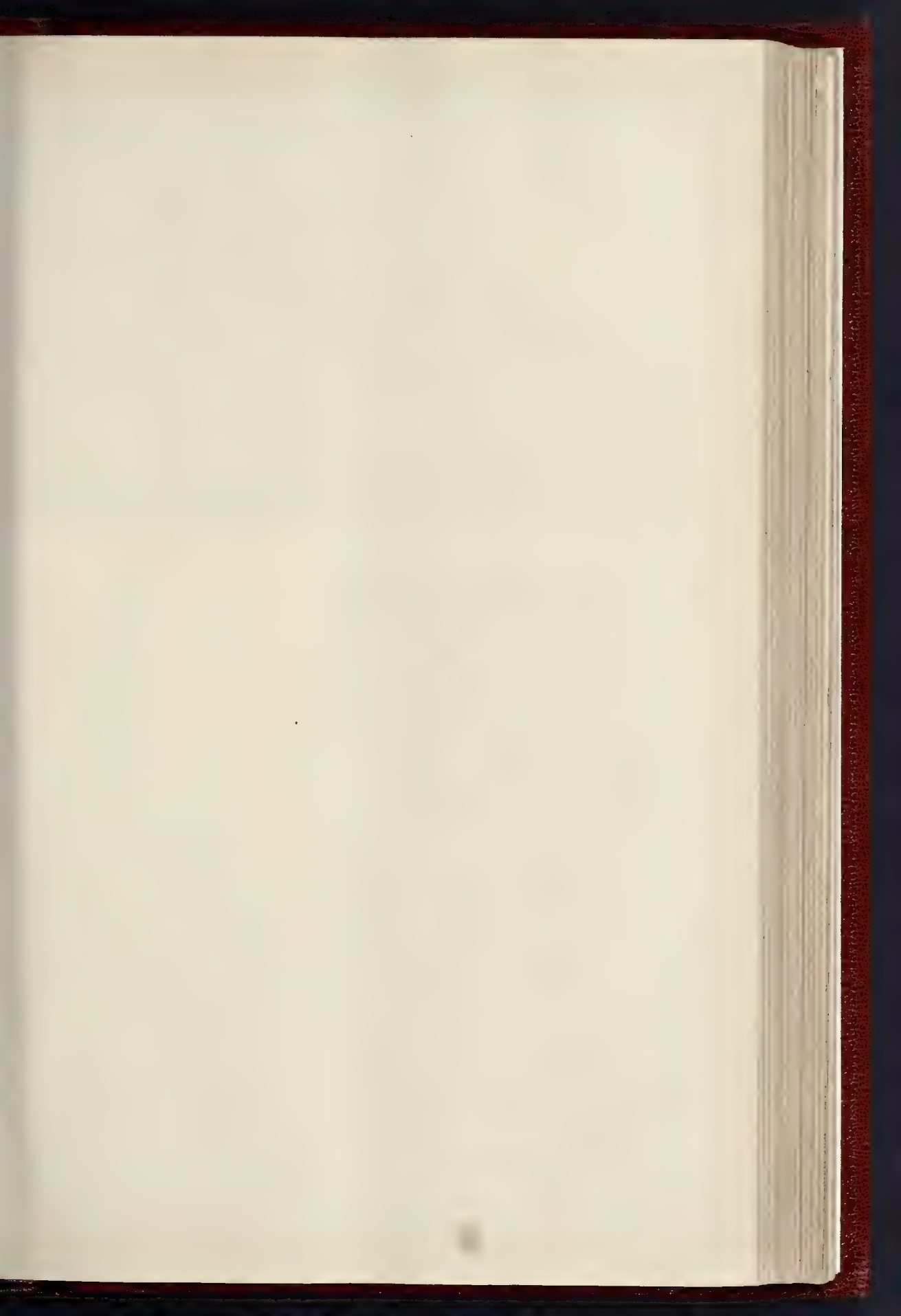


THE BUILDER, SEPTEMBER 30, 1893.



St. James
-1893







4

1. The Group "Columbia," East Entrance of Machinery Hall.—Mr. A. Waagen, Sculptor.

2. "Europe": Group from Ag

4. "Locomotive" Group: from Transportation Building.—Mr. John J. Boyle, Sculptor.



5



3

GO EXHIBITION.

-Mr. Philip Martiny, Sculptor.

3. "America": Group from Agricultural Building.—Mr. Philip Martiny, Sculptor.

5. Statue of "The Republic" (65 ft. high).—Mr. Daniel C. French, Sculptor.



Fig. 8.



Fig. 9.



Fig. 10.



Fig. 11.



Fig. 12.



Fig. 13.



Fig. 14.



Fig. 15.

Ancient Crosses in the Isle of Man.—Drawn by Mr. Archibald Knox.

REFERENCES

Fig.	Description	Width	Height	Fig.	Description	Width	Height
1	Thirl Ness Cross, Kirk Brallan	1 ft. 6 in.	10 ft. 6 in.	11	St. Peter's Cross, Kirk Michael	1 ft. 6 in.	10 ft. 6 in.
2	Thirl Ness Cross, Kirk Brallan	1 ft. 6 in.	10 ft. 6 in.	12	St. Peter's Cross, Kirk Michael	1 ft. 6 in.	10 ft. 6 in.
3	Thirl Ness Cross, Kirk Brallan	1 ft. 6 in.	10 ft. 6 in.	13	St. Peter's Cross, Kirk Michael	1 ft. 6 in.	10 ft. 6 in.
4	Thirl Ness Cross, Kirk Brallan	1 ft. 6 in.	10 ft. 6 in.	14	St. Peter's Cross, Kirk Michael	1 ft. 6 in.	10 ft. 6 in.
5	Thirl Ness Cross, Kirk Brallan	1 ft. 6 in.	10 ft. 6 in.	15	St. Peter's Cross, Kirk Michael	1 ft. 6 in.	10 ft. 6 in.
6	Thirl Ness Cross, Kirk Brallan	1 ft. 6 in.	10 ft. 6 in.	16	St. Peter's Cross, Kirk Michael	1 ft. 6 in.	10 ft. 6 in.
7	Thirl Ness Cross, Kirk Brallan	1 ft. 6 in.	10 ft. 6 in.	17	St. Peter's Cross, Kirk Michael	1 ft. 6 in.	10 ft. 6 in.
8	Thirl Ness Cross, Kirk Brallan	1 ft. 6 in.	10 ft. 6 in.	18	St. Peter's Cross, Kirk Michael	1 ft. 6 in.	10 ft. 6 in.
9	Thirl Ness Cross, Kirk Brallan	1 ft. 6 in.	10 ft. 6 in.	19	St. Peter's Cross, Kirk Michael	1 ft. 6 in.	10 ft. 6 in.
10	Thirl Ness Cross, Kirk Brallan	1 ft. 6 in.	10 ft. 6 in.	20	St. Peter's Cross, Kirk Michael	1 ft. 6 in.	10 ft. 6 in.

treatment is always charming, and never spoiled by notions of symmetry, always direct, and the pattern has practically no other relief than that given by the cut which delineates it.

Thorlaf Neaci's Cross at Kirk Braddan is in its contours and proportions distinct from all the other crosses in Man, and its mass suggests a conception different from and better than what its decoration indicates. Bridson's Cross is the grand type of practically all the crosses. In structure, Thorlaf Neaci's Cross has the incomplete conception characteristic of the eastern crosses. The pattern on it is identical with that on Bridson's Cross.

This pattern is the only one Gaut uses, and it occurs in its simplest form on Bridson's Cross. It consists of two waved lines crossing and recrossing, locked at each crossing by a ring, which, independently, or in some not readily distinguishable motive, grows out of one wave and in a symmetrical arrangement encircles the crossing and attaches itself to the other.

It expresses the very elementary sentiment of stability out of which the art of the builder grows. The cross and its encircling nimbus, which is the subject of his art and the symbol of his salvation, he adopts as a form which he makes to constantly recur in one guise or another. This is the essential principle of his art.

There are some half-dozen variations of this arrangement of Gaut's pattern. Of these, the one on Thorlaf Neaci's Cross of the adder winding through curling grass is the most important among them. The accident of style, which limits expression, does not control fancy nor prevent sympathy for spectacles such as this indicates.

In a recent summer among the mountains that lie between Kirks Braddan and Michael, I saw the same pattern which Gaut uses on Bridson's Cross used by a young girl for the decoration made with whitening stone on the threshold stone of her house.

The accommodation of pattern to the shape of the arms of the cross, as in the cross of Bridson, is good; but on all the crosses where pattern occurs the device used does not vary from this, nor do the patterns on the shafts often have any organic relation to the arrangement in the head of the cross. Of further value in determining the sense in which Gaut's declaration that he made all the crosses in Man is to be understood, is the use of the spirals, as on Olaf's Cross at Kirk Michael, and on the Onchan Cross, and, of equal importance with their use, the blank space on the shaft of Malunukun's Cross at Kirk Michael.



Fig. 16

On all the crosses, however, they seem locally to differ from the remainder, are to be found

many similarities of pattern and fancy, which lead the mind only to the conclusion of the common and personal origin of them all.

The past history of the crosses is hardly known. Some now serve a common purpose—for the market and the wayside; most are gathered into the churchyards of the parishes; and it cannot be said of any stone that it stood here or there. All may have been memorial in their origin, and would seem once to have crowned the brow of tumuli, which yet, green and round, are real against the ever hopeful sky. Some of these mounds have been, and some still are, the common burial-places of the people of the district.

Druian's cross at Kirk Bride, though now in the churchyard, is still within a district that bears the name of Druian.

On the banks of the Santon Burn was until about two years ago, a cross which was apparently in its natural environment. From its station could be seen along the river banks from its source to the sea, remains to the number of twelve or more of chapel and mound of burial, fort, and mill, and many places whose names mark the time when the island was in admiration named the Holy Island. This cross has recently been removed, and its location is unknown to those who formerly knew it and lived near it. It was without skill or imagination, the very rudest of workmanship, and in itself of little consideration.

Reasons for retaining relics such as these amidst their natural surroundings, are not demonstrable like a theorem in arithmetic, but while "practical" reasons for storing them in a museum or show-place are always at hand, the land is piece by piece becoming poor indeed.

The figures, and the incidents of which they are the subject, which in a few cases are found on the spandrels of the slab, and in two cases on the cross itself, are of little direct artistic interest.

The dresses in which they are clothed are of two kinds, of which the dress of the harper on Malunukun's cross is a complete example of one kind. In some cases the breast and waistband of this suit are ornamented, and in the case of the figure below the harper, the cloak, which also occurs on other crosses, seems to cover a dress similar to that of the harper. Of the other kind is the kilt, which in the case of Gunnar seems to hang from the shoulders, and in other figures is also confined at the waist by a band.

Beyond this broad delineation, nothing can be seen of the aspect of men. The treatment of the figures is only as a silhouette. Occasionally a head-cover, a basket, or a sword is to be seen, but that is all.

Of what they are the subject is not easily to be discovered. Popular knowledge connects them with Norse work, and it is probably among such work that a solution of some of the subjects on the crosses will be found. There is a common subject on all the crosses, that of the hunt of the deer by dogs and a rider on horseback or by men on foot. This is accompanied by various incidents apparently incongruous, and it is impossible to separate the elements of the episodes. There are the subjects, several times repeated, of a man stabbing a serpent with a sword, a man with a bird on his shoulder, a group of men beneath the feet of an animal, but what they refer to has disappeared from popular tradition.

But what is absent from the crosses is as much a matter for wonderment as what is on them. More still a matter for wonder is the fact of the existence of the crosses. The exuberance and humour of them, as much in the fancy of the persons for whom they were made as of their maker, are, amidst the simpleness and austerity which have always distinguished the life of the island people, like a cloud which for a short time appears in the blue depths of the sky.

Such is the work of Gaut, the son of Biarn, of Cooley, and the faithful friend of Bridson the smith.

ARCHIBALD KNOX.

Douglas, Isle of Man.

CLASSES FOR BUILDING TRADES.—For several years the Carpenters' Company, in conjunction with the Institute of British Wood Carvers, have carried on classes for wood-carving in Chapel-street, Bedford-row. Having outgrown the accommodation there, they are now inaugurating a much larger scheme. The premises known as the West London School of Art, at 155A, Great Titchfield-street, have been taken, and it is intended to have classes there, with competent teachers, for all the trades connected with building. Already the Tylers' and Bricklayers' Company have joined, and besides the wood-carving classes, which are in full operation, classes for carpentry, joinery, and bricklaying will be commenced on October 2.

ARCHITECTURAL ASSOCIATION SUMMER VISITS: HATFIELD HOUSE.

On Saturday last the final summer visit of the year was made by about sixty members to the well-known residence of Lord Salisbury, and doubtless if the weather had been more summer-like, instead of cold and wet, the number would have more closely approximated to that on the previous visit of the Association to Hatfield, which was fully described in the columns of the *Builder* with an account of the house and its adjuncts, including the neighbouring parish church. This account we need not therefore repeat. After visiting the house, the cold and damp lessened the enthusiasm of the visitors for further researches, but some visited the church, and the majority joined together in partaking of the tea which had been arranged by Mr. Woodthorpe, who undertook the organisation of the visit.

Books.

Les Artistes Célibres: Les Bouille. Par HENRY HAVARD. *Philippe et Jean-Baptiste de Champagne.* Par A. GAZIER. Paris: Allison et Cie.

THE volume of *Les Artistes Célibres* dealing with Bouille and his work ought to be of special interest to our readers, for few furniture designers have had a larger following or a more important influence on taste in design of this class, in their own day and long afterwards. Indeed, as M. Havard observes, if we are to measure the happiness of every artist by the reputation he acquires while living, and the notoriety which remains around his name after death, André-Charles Bouille must be regarded as one of the most privileged of men. It is of him that M. Havard has chiefly to speak, for though his sons carried on his art after his death, it was he who made the name famous and established the taste for the style of furniture design which is connected with it.

Half-a-century ago, when the Medieval movement was commencing, the work of Bouille was regarded with horror, as vulgar, showy, and destitute of all pure taste. In the present day it is likely to be regarded with much greater respect, and perhaps with more admiration or indulgence than it can rightly claim. There is no doubt an element of vulgarity, in the artistic sense, about Bouille's work. There is a total absence of reserve or restraint about it; it is the kind of furniture which is expressed by the word "handsome"; it seems always to aim at making as much show as possible, and details, figures especially (or rather parts of figures), are lumped on to it without regard to their relation to the lines of the whole, just to give an effect of richness. Some of Bouille's defects, however, are those of the prevalent style of his day—a day of showy and tawdry ornamental detail. On the other hand he often employed this type of detail better than his contemporaries; there is a unity of conception about his furniture pieces; and while they always make a false note in what may be called a "domestic interior," there is a kind of pompous character about them, without littleness, which renders them exceedingly suitable for the furniture of palatial rooms, where there is plenty of space for their large curves and swellings to be in no one's way, and where everything else is sumptuous and in keeping with their style. There is never any repose in a Bouille design; but the generation and the class for which Bouille worked did not want repose. One of the worst points about his furniture is the frequently very bad design of the legs or feet, which seldom seem designed for the purpose of support. But Bouille filled a large part in the art work of his day, and merited a special record. The present one is largely illustrated with engravings of his designs, and is altogether an interesting addition to a library of artistic bibliography.

We cannot feel the same interest in the biographical sketch of the two Champagnes, portrait painters (mainly) who have not much repute beyond France. The "Vanitas," by Philippe, a study of a skull, a richly ornamented watch, and a glass vase of flowers, shows that he could on occasion do something effective and suggestive in still-life painting. The numerous engravings from the portraits made by these artists, many of which are of well-known and famous men of the time of Louis XV. and XVI., give an interest to the volume.





VISITORS' STAIRCASE, "AVERY HILL"



Bibliothèque d'Éducation Artistique. Motifs Décoratifs. Par JULES HABERT-DYS, AUGUSTIN DE SAINT-AUBYN, et JEAN J. FRANÇOIS LE BARBIER. *Alphabets.* Par JULES HABERT-DYS, G. MARIA MITTELLI, JEAN DANIEL FRILISLER, THÉODORE DE BRY, et FRANÇOIS E. EHLMANN. Paris: G. Pierson et Cie.

THESE are small pamphlet publications containing sets of designs, by the various artists named, for ornamental alphabets and "Motifs Décoratifs." The latter mean, of course, the kind of small decorative designs which are used as headings of chapters, &c. The French have a great love for these decorative adjuncts, and show much variety and spirit in their design, but in the majority of cases with a great want of real feeling for decorative style and treatment. Generally speaking, the style of treatment is too naturalistic, when objects from nature are used, and the design too ragged in line; in fact, this latter seems to be an object with the French designers; the idea of restricting the design within formal lines harmonising with the lines of the page and the type never seems to occur to them; to be free and spotty is the object. M. Habert-Dys, the only modern artist of the set, draws largely on animals, birds, and flowers for his "motifs"; they are all well drawn and carefully studied and grouped, but there are few that an English artist would care to make use of for the purpose for which they are intended. They go too far towards being pictorial for use as head and tail pieces, and for the most part they are deficient in point or meaning. Now a head or tail piece of this kind should have a meaning, to give it real interest; should suggest some little fancy or allegory. This additional interest is quite wanting in most of M. Habert-Dys's cleverly-drawn sketches. Saint-Aubin's (1736-1807) represent the old French taste for collections of medals, masks, and other articles grouped together; a taste still in force with some old-fashioned French periodicals. We should be very sorry to make use of them. Le Barbier's designs (1738-1826) are many of them superior in grace and in thoughtfulness to either of the above mentioned sets; some of them are very suggestive, and he introduced the figure well. Among the sets of alphabets named, three are old, and four (three by Habert-Dys and one by Ehrmann), modern or comparatively so. Of the old ones, those of Preisler (Nuremberg, 1660-1737) are the best; they are purely decorative in the old German style of elaborate intertwining, and are in good taste; their defect being a want of clearness of definition of the letter. Those of Mitelli (Bologna, 1634-1718), consisting of figures of men twisted or posed into the shape of letters, are detestable; and those of De Bry (Liège, 1528-1598) are only historically interesting; they represent the exuberant fancy of the Renaissance not in its best form; large letters, with nude figures seated on or climbing about them, and hung with all kinds of unmeaning accessories. Of the modern sets, those of M. Habert-Dys show great variety and cleverness, and are treated in a much more conventional and decorative manner than his "Motifs"; but there is a kind of showy cleverness of line about them, looking like the decorative efforts of a clever writing-master, which is vulgar in spite of its cleverness. The letter S which we give from

one of them will show what we mean, and we think most of our readers will agree in our estimate of this kind of work. We should add that in the more elaborate set in which birds and animals are freely introduced as adjuncts to the letters they are very cleverly drawn and treated—but there is always this rather *cliquant* style about the designs. The alphabet by M. Ehrmann is much the best of the whole. He makes the human figure his principal object, and draws and designs it really well and with true feeling for decorative effect. We give the S from his alphabet, as an example of his method. If we mis-



Initial letter: by M. Ehrmann.

take not, he has long furnished the initial letters for *L'Art*.

An examination of the whole set of these collections serves to show that we have nothing to learn from the French in this kind of design, more especially in the class of "Motifs." In sculpture and in some branches of painting the French are our masters; but in this kind of decorative design there are head pieces appearing in some of our illustrated magazines every month which in decorative effect, in refinement of taste, and in poetic suggestiveness, are far beyond anything the French designers can show us, if these books are at all fair specimens of their work.

Correspondence.

To the Editor of THE BUILDER.

PORTLAND ROACH STONE.

SIR,—I was much gratified on reading (under the heading of "Notes" on page 203 of the issue of your valuable Journal of 16th inst.), the article respecting Portland Roach stone, because I have, for a considerable time, been doing my utmost to again bring this stone to the front. It has fallen into disuse, I believe, simply in consequence of another generation of architects having the construction of present-day buildings in hand, and who, like the Egyptian king who "knew not Joseph," are strangers to this important, cheap, and uniquely weathering product of the Island of Portland.

I am glad, however, to say my efforts appear to be meeting with a certain amount of success, and for some considerable time now I have had orders for this stone upon my books, a further augmentation of which I have received this morning. It was formerly sent from the island in very large quantities annually, and reference to the works in which it was used, and likewise to the many and very extensive Government works (fortifications, breakwater, &c.) here—without forgetting the parish church, to which reference was made in your issue referred to—will prove how splendidly this stone is able to resist every kind of atmospheric influence, and from a series of tests made here some years ago by the late Sir John Coode, C.E. (copy of which I have), it was proved to be, to all intents and purposes, fully equal to granite for all ordinary engineering purposes.

When passing Messrs. H. Castle & Sons' timber-yard, Millbank end of Vauxhall Bridge, recently, I noticed their entrance-gate piers were made out of Portland roach stone, and I think your readers will early next year be able to see a very fine example used in a large public building which will then be in course of construction in London.

There is also, in the island, another bed of stone which is used locally for building purposes, and particularly when immediately adjoining or near a fire, which I think only requires to be brought to the notice of architects, who would find it to be admirably adapted for a variety of building

purposes, especially for cores for making cement cornices, &c.

Any information which your readers might wish to have it would afford me the greatest pleasure in furnishing them, especially as I have so long endeavoured to re-introduce this stone into the market as formerly.

F. J. BARNES.

The Student's Column.

GEOLOGY.—XIV.

STRUCTURAL DEFINITIONS.

HAVING defined the origin, structure, and composition of the various classes of minerals and rocks useful to the architect and builder, we are now in a position to describe certain physical and structural terms affecting the mode of occurrence of all, or nearly all, rocks; after which, the divers causes which have brought about the present configuration of the surface of the country, and the influence of geology on scenery, will be alluded to in much detail.

Bedded Strata.—Stratified rocks of little thickness frequently present much variation in lithological character; sand alternates with clay, or both may be parted by thin layers of limestone. Each of these different kinds of rock is called a bed by the geologist (not by the quarryman, who adopts another meaning for the term), or a stratum. In each bed a number of lines, marked by being of slightly different tint, or otherwise, may often be observed; these are termed "lines of stratification." When these lines or layers are parallel to one another the rock is said to be "bedded," and when they are very close together it would be called "laminated." The term "bedding" is sometimes applied to tolerably thick strata presenting no distinct lines of stratification beyond those which define it lithologically from the bed below and above.

False Bedding.—Where the lines or planes of stratification are not parallel, but cut each other in series in divers directions. Such a structure is

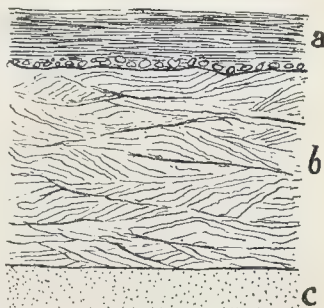


Fig 1.—False Bedding, Oldhaven Sands, Herne Bay.

a. London clay, with pebbles at base. b. Oldhaven sands, false bedded. c. Thanet sands.

frequently found in sands and sandstones, and denotes that they have been laid down in shallow water, where the currents have continually shifted about the material.

Ripple Marks.—These are observed on the surface of many thin-bedded sandstones, used for paving purposes. They are irregular ridges, half an inch or so in height, and a few inches apart from each other, which have formed in very shallow water. Gentle breezes causing little ripples on the surface of the water have produced the phenomenon.

Rain Spots.—Pittings on the surface of soft shore deposits, which have subsequently become covered up and preserved by sediment gently laid down on the return of the tide. Many passing showers in Palaeozoic times have thus left their mark behind, and show us, with other things, that certain atmospheric phenomena in those remote periods must have been very similar to what obtains at the present day.

Sun Cracks.—The heat of the sun in drying the surfaces of clays and muds between tide-marks causes cracks to form in the material, and these also have their counterpart in almost the most ancient rocks. The tracks or trails of crawling organisms, together with the footprints of various extinct animals which wandered along the shore, have likewise been carefully preserved to us.



Initial letter by M. Habert-Dys.

Dip.—The inclination of strata to the horizon resulted from the sediment not having been originally laid down horizontally, or (more frequently) from having become tilted at an angle by the action of subsequent earth movements. *a* in fig. 2 represents the dip of strata. The amount

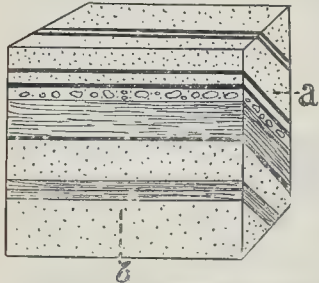


Fig. 2. Ideal Section showing Dip and Strike of Strata.

a, Dip face; *b*, strike face.

of dip, or angle of inclination, is determined by a simple instrument called a clinometer.

Strike.—A direction at right-angles to dip, illustrated by *b* in Fig. 2. Strata always appear

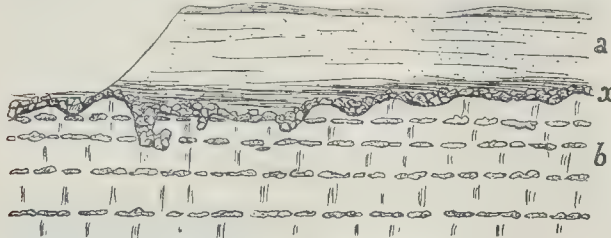


Fig. 4.—Section at Orfington, Kent.

a, Thanet sand, horizontally stratified, capped by mould; flints at base.
b, Chalk, with areas of flint, also indicating horizontal bedding.
c, Uneven line of junction.

to be horizontal along their line of strike, and the incautious observer may thus often be led astray as to the real disposition of strata. In order to arrive at the true dip of any bed, it is necessary to see two contiguous sections of it more or less at right-angles to each other. Neither section may reveal the actual strike, or dip, but observations on the two exposures enables the student to arrive at the amount of inclination by a simple mathematical process. An experienced geologist in mapping rocks can often arrive at an approximate angle of dip by observation on one exposure only from his knowledge of the general direction of strike of the rocks of the district.

Outcrop.—Where strata become exposed at the surface of the ground; if, for instance, the existence of a bed were known only from wellborings and mining operations, and does not come to the surface, it would be said to have no outcrop. When beds are horizontal, the direction and area of outcrop are dependent on inequalities of the surface of the ground, by the removal of superficial deposits, or from analogous causes.

Unconformity in strata is a common phenomenon, requiring more explanation than I have space to devote to it. There are several kinds of unconformities. Fig. 3 represents one where a

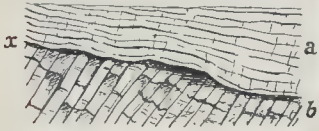


Fig. 3. Unconformity, near Clifton, Bristol. Unconformity marked at different angles to each other.

a, Trias. *b*, Devonian. *x*, Unconformity.

lower bed, *b*, dipping at a high angle, has been extensively denuded prior to the deposition of bed *a*. The two formations concerned would be said to be unconformable to each other, and in this case indicates an enormous lapse of time between their respective epochs of deposition, for

the Devonian was laid down in water, then raised into dry land, denuded, and submerged again before the Trias was deposited on its tilted edges. In the interval, the whole of the Carboniferous and Permian were in process of construction, and the fauna and flora of the whole earth underwent a complete change. Much more striking examples of the meaning of unconformity could be adduced. Thus, deposits at present forming off parts of the Welsh coast are being laid down on Archean rocks; the unconformity in that case representing the lapse of practically the whole of geological time since the appearance on earth of the first organisms of which we have any certain knowledge, to the present epoch. On the other hand, instances could be quoted from Norfolk and Suffolk where an unconformity exists between the Pliocene (a very recent deposit) and the formations now in progress off the adjacent coast.

Another kind of unconformity is where the rocks are not inclined at different angles to each other, but the upper bed rests on the denuded or uneven surface of the lower. In fig. 4, where, the planes of stratification of both formations concerned are practically parallel to each other, the bed *a* rests unevenly on *b*. It may be well to remark in reference to this particular illustration that the unevenness of the surface of the chalk is not the direct result of denudation prior to the deposition of the Thanet sand. The irregular line of junction as now seen, is due to the agency of percolating water which has dissolved the upper surface of the chalk (it was

stone dressings. The ground story to Greengate street is occupied by two bold elliptical arches and piers. Over these a large oriel window, having stone mullions, cornices, parapet, and corbel springing from between the arches in a curved boss, forms the principal feature of the front. It is flanked on either side by a narrow one-light window, with stone dressings. The elevation terminates in a gable with five-light window, surmounted by moulded copings and scrolls, and finial terminations. The roof is covered with tiles of a dark strawberry colour, and has an ornamental turret springing from the ridge, eight-sided, and ornamented by scroll-kneelers and turned finials. On the ground floor, and facing Greengate street, are provided a lock-up shop, 21 ft. by 14 ft., an public entrance, vestibule, and lobby. The rest of this floor is occupied with club accommodation. The whole of the next floor is occupied by a public hall, in connexion with which are cloak-rooms and dressing-rooms, communicating by private passage with the stage. The hall measures 53 ft. by 27 ft., the height to ceiling being 23 ft. The stage is 17 ft. in depth, and the present opening 16 ft. wide. Over the cloak-rooms a gallery formed capable of accommodating 100 persons, rising tiers, and there are in all seats for about 500 persons.

NEW POST-OFFICE AT GLOUCESTER.—The new Post-Office was opened on Monday. The front portion of the Corn Exchange, formerly occupied by the Corporation, has been transformed, and will be used as the Post-Office. The Tolsey had been for a great many years the home of the postal officials, but the old building had become quite inadequate for exigencies of the present circumstances. After some negotiations the postal authorities secured a portion of the Corn Exchange, being the most convenient site for their offices. The facade of the Exchange has been slightly altered, while the entrance to the large hall has not been curtailed, as has the building been entered with. The ground floor is set apart for the general office, being 42 ft. long and 25 ft. wide, with a long counter on the right-hand side. The end of the counter near the entrance will be used for the issuing of money orders and the Post-Office Savings Bank, while the central portion of the counter will be devoted to the sale of stamps, &c., immediately behind which are the old private boxes from the Tolsey office. The top end of the room has been set apart for telegraphing and parcels post. Every convenience has been made for the adequate despatch of business in this department. On the first floor are the postmaster's private room and the chief clerk's and public enquiry office. On the same floor is the clerk's retiring room, and well-arranged lavatories are also on this floor, as well as on the ground floor. There is also a store-room adjoining. On the top floor is a store-room in connexion with the Savings Bank, Parcels Express Delivery, and Parcels Post, on the same landing of which has been preserved the strong room, formerly used by the Corporation. Mr. William Jones, builder, has carried out the structural alterations, and Messrs. Bissell, of Bristol, were entrusted with the internal fittings.

A BUILDING MANIA.—A writer in the *Bath Chronicle* says:—"At Gay's Hill, Bath, houses are criss-crossed close to the back of others as effectually to screen off both air, light, and view, not to speak of other nuisances created by such close proximity, and in addition to the evils described, the tenants have been deprived of their allotments, which gave the men healthful employment in their leisure hours. In close proximity to these new houses will be the concluding series of a long row called Belgrave, the new approach to the completion, but just in front of the second row of houses in Camden-road, thereby depriving its inhabitants of the fresh air, space, view, and privacy which they so much prize, and of course greatly deteriorating the value of the property. Below these two long rows a third has been built, and now the new houses behind Gay's Hill will form the fourth, all on the slope of the hill, and crowding up what might well be called 'the lungs of Bath.'

RESTORATION OF IRTHLINGBOROUGH TOWER.—The re-dedication by the Bishop of the diocese of the Irlthingborough church tower and bells, after restoration, took place on the 20th inst. The old tower (a well-known and picturesque structure) was in a very dangerous condition. The new tower is on the old site, and identical in shape and build to the old one. It has been erected by Messrs. Brown & Sons, Wellingborough, from the plans of Messrs. Talbot, Brown, & Fisher, architects, also of Wellingborough. Most of the old structure was of Barnack stone. The new one is of Barnack stone, Weldon stone, and ironstone. The cost has been about 2,800l.

ENLARGEMENT OF ST. MICHAEL'S CHURCH, BISHOPSTON.—The laying of the foundation-stone of the north aisle, transept, and vestries of St. Michael and All Angels', Bishopston, was performed by Lady Lucy Hicks-Beach on the 21st inst. in the presence of a large assemblage of spectators. The continuing population of the suburb of Bristol and the crowded state of the church have made it necessary to increase the church accommodation. The church has been already enlarged three times since it was built in 1858; but it still seats only 520. The proposed present addition is that of a north aisle, transept, vestries, and organ-

GENERAL BUILDING NEWS.

STAFFORD ODDIETOWNS AND FRIENDLY SOCIETIES' HALL.—The new building which has been erected in the main street of Stafford to meet the growing requirements of the friendly societies of the town was opened on Monday. In the first instance, a premium was offered for the best design for the hall, and was won by a London firm of architects. Subsequently these plans were found not to meet requirements, and the Building Committee instructed Mr. George Wormal, architect and surveyor, Stafford, to prepare entirely new designs. Difficulties, however, arose with regard to ancient lights, which rendered necessary new plans, and the design as now carried out was the outcome. Tenders were obtained, with the result that Mr. W. T. Wooliams's estimate was accepted at 2,400l. The hall is built of red pressed Ruabon bricks and Bath

chamber, which will add about 250 seats, and, together with a suitable system of warming and ventilating the church, will, it is anticipated, cost upwards of 2,000l.

NEW ROOF TO ST. MICHAEL'S CHURCH, LYNDBURST.—The new roof to the church of St. Michael and All Angels, Lyndhurst, has now been completed, at a cost of over 1,000l., Mr. White, F.S.A., of London, being the architect.

NEW CHURCH AT ABERFOLY.—The memorial stone of the new Episcopal Church of St. Mary, which is now being erected at Aberfoly, was laid last week in presence of a large gathering of people. The site on which the church is being built is situated at the eastern extremity of the village. The church consists of a nave and chancel, with south transept, and the roof is an open timber one. Externally the lower part of the wall are built of native blue rubble, the upper part being rough cast and coloured white. The roof is covered with dark-blue slates from Aberfoly quarries. Rising from the roof is a stone belfry, which marks (externally) the division of nave and chancel. The church accommodates 200 persons, exclusive of choir seats in chancel, and will be seated with chairs throughout. The architect is Mr. James Miller, Glasgow.

NEW CHURCH AT NORTHAMPTON.—The Bishop of Peterborough consecrated a new church, dedicated to St. Matthew, on the 21st inst. The church has been built by Mr. Pickering Phipps, as a memorial to his late father, who was for many years member for the borough. The building is in a highly decorated style of architecture, the chancel being vaulted and the nave spanned by stone trussers, above which expands a fine open roof. The baptistry at the west end is also vaulted, and provision is made between the choir and the north chapel for a minstrel's gallery. The whole of the church is lighted by electricity, which also is used to work the organ. The total cost will be about 20,000l., and the architect is Mr. M. H. Holding, and the builder Mr. Henry Martin.

ROTHERHAM.—On the 21st inst. the ceremony of laying the foundation-stone in connexion with a Sunday school which is in course of erection by the Primitive Methodists of Masborough, took place in the presence of a large assembly. The site is on the old College estate, "College-road, Masborough," and it is intended to build a chapel to seat upwards of 700 worshippers, and a Sunday-school to accommodate 600 scholars. Contracts have been let amounting to about 3,500l. The new building is to be of the Renaissance style of architecture. Mr. Howdill, of Leeds, is the architect.

SANITARY AND ENGINEERING NEWS.

POLLUTION OF WATER AT SALFORD.—The York people have been by no means alone in having reason to complain of the state of the local rivers. There have been loud complaints from several other localities with regard to noxious effluents arising from local streams, canals, &c. Especially noteworthy is the complaint from Salford that the Manchester Ship Canal has become dangerous to the health of the inhabitants of the county borough, and the neighbourhood. The President of the Local Government Board admitted recently in Parliament that it was a very difficult and perplexing matter of undoubted seriousness. The Canal company has impounded 114 acres of water in the borough of Salford, and that area contains the sewage of an immense mass of population on the banks of the Irwell. That it is injurious to health is not denied. It has been suggested that, by way of elucidating the difficulty as to responsibility, &c., proceedings at law be taken against the Canal company, and that application be also made to Parliament for further powers. But while in Salford there seems to be no doubt as to the sewage or where it comes from, here in York it would seem as if certain people cannot be got to realise and admit that it is really the condition of the water of the Foss.

NEW SEWAGE WORKS AT OLDHAM.—The Mayor of Oldham (Mr. Alderman Notcutt) cut the first sod last week of the new sewage works for the borough. The works are in the Slacks Valley at Hadderton, and the cost of the scheme will probably not fall far short of 200,000l. Mr. Law, engineer of the works, describing the sewerage scheme, said the governing principle upon which it was designed was to intercept the sewage by means of the dry weather sewer, and only use an amount of water in the sewer as it was intended to convey to the outfall works. The total length of the sewers was about 10 miles. An area of about 100 acres at the northern extremity of the borough was at too low a level to drain into the intercepting sewer by gravity, was intended to lift the sewage from this area to a higher level by means of Shone's ejectors, and to be discharged in a chamber beneath the outfall works by the agency of compressed air, and to be a very simple arrangement the sewage from the Manchester Road sewer would be made to compress air for working the ejectors, thus obtaining the requisite power without any expense. The total estimated cost of the undertaking, including the purchase of the land and engineering and other expenses, was 200,000l. Of this sum the engineer's estimate for the works was 130,000l. The Corporation recently advertised for tenders, with the result that

they obtained offers from responsible contractors which showed a saving on the engineer's estimate of upwards of 7,000l.

SEWAGE SCHEMES AND ELECTRIC LIGHTING, MONMOUTH.—At a special meeting of the Monmouth Town Council, held on Friday morning, the Mayor presiding, a complete system of drainage, combined with the introduction of electric light for public and private purposes, was unanimously adopted by the Council. The sewage scheme accepted is by Mr. Nicholson Lailey, of Westminster, S.W., and the electricians are the Brush Electrical Engineering Company, London, both of whom furnished exhaustive reports, and the gross expenses of the complete scheme are set down at 15,050l., which will be borrowed and repaid by thirty equal instalments. As the profit from the electric light will be considerable, it is estimated that a 5d. rate will be sufficient. The sewage would be delivered into a reservoir through an outfall sewer, with a gradient of 1 in 250 or about. On arrival at the precipitation tanks all coarse particles would be removed and the sewage mixed with ferrous, afterwards passing through a channel to the tanks, which, when filled, would be shut to allow two hours' precipitation. The water would then be removed, passed on to filter-beds, irrigated over the land, and finally into the river purified. The sludge, then going by gravitation into sludge bays or lagoons, would be air-dried, or, if required, pressed into cakes of manure. The machinery would be worked by hydraulic pressure—the sewage pump by day and the dynamo by night.

THE WATER SUPPLY OF LEEDS.—The prolonged drought is keenly felt by the public and the authorities. The former are accustomed themselves to the order that the water supply shall cease at seven o'clock at night; and the authorities view with anxiety the fact that the water in the reservoirs is only 2½ days' supply. This is the lowest figure that has ever been reached since the present system was inaugurated. At this time last year the supply was 103 days. In the Fawcett reservoir there are 86 million gals., compared with 76½ million gals. at the corresponding date last year. The Wharfedale contains 33½ million gals. of water, whereas last year the quantity was 904 million gals. At Lindley Wood there are 82 million gals., and last year there were 616 million gals. The total available quantity is 500 million gals., as against 2,283 million gals. last year. The present daily requirement is 3½ million gals., and at the same time last year it was 2½ million gals.

STAINED GLASS AND DECORATION.

LANDPORT.—The chancel of All Saints', Landport, Hants, which was one of the last works of the late Sir Gilbert Scott, has lately received an east window, representing the "Ascension," from the studios of Messrs. Mayer & Co., of Munich and London.

A NEW STAINED GLASS WINDOW, BYFIELD.—The west window in the tower of Byfield Church, which has just been filled with stained glass, was unveiled on Sunday last. It is a two-light window, and is a memorial to the late Mr. John Bromley, for many years churchwarden of the parish, and Sarah, his wife. The subject is a representation of the Apostles SS. Peter and Paul, with their usual symbolic emblems. The colours are subdued, but the design is very tastefully arranged to prevent the darkening of the nave of the church. The window was designed and executed by Mr. Kemp.

FOREIGN AND COLONIAL.

FRANCE.—There is to be raised at Peronne (Somme), on the esplanade of the château, a monumental statue in bronze to Marie Fourré, a celebrated heroine who in 1593 saved the town from invasion. The town of Clichy is building a large municipal abattoir, intended to replace the various existing smaller ones which serve the west part of the suburban zone of Paris. The Société des Amis des Arts of Nantes is to open an art exhibition in February next, to remain open during the month. M. Blavet (architect) has just finished, in collaboration with M. Dolivet (sculptor), the design for a "monument à la gloire de Germain Pilon," which is to be erected at Mans, the native place of the celebrated sculptor. The monument will be composed of a triangular pedestal, somewhat resembling that of the "Trois Graces" in the Louvre. At the angles of the pedestal will be three caryatides, and on each of the faces small figures in bronze representing Sculpture, Painting, and Architecture. Above the pedestal will be a marble column crowned with a Renaissance capital surrounded by a bronze bust of Germain Pilon. As has already been mentioned in our columns, the "Palais du Capitole" of Toulouse is the object of some very important decorative work, which has been entrusted to eminent painters and sculptors, all natives of that town. MM. Falguière and Mercier have accordingly been commissioned to decorate the intercolumnar spaces in the Salle des Illustres; and the same two sculptors will also complete the Galerie des Archives. Some large compositions are to be executed by M. J. Paul Laurens. Three ceilings will be entrusted to MM. Benjamin-Constant, Rixens, and Debat-Ponsan, and six

panels of *genre* scenes are to be painted by MM. Henri Martin, Destrem, Gervais, and Rachon. The town of Djelfa (Algeria) has opened an architectural competition for the building of a monumental maire. The death is announced of M. Dauterive, architect to the City of Rheims, and officially attached to the Mairie. M. Falguière has just completed a fresh model of the "Monument de la Revolution Française," intended for the Pantheon. This new model will shortly be erected in its intended position of the work, in order that the Fine Arts Committee may judge if the work is sufficiently in harmony with the general decoration of the building. M. Roger Ballu, "Commissaire-Général des Expositions," has just presided at the opening of the Tourcoing Exhibition. The observatory at Mont Blanc, situated at 4,812 metres above sea level, has just been completed. The *Journal Officiel* has just published the list of the General Committee for the Paris Exhibition of 1900. We observe with great surprise that the list, which numbers about one hundred names, includes no architects, and even the "Directeur des Bâtiments Civils," the chief of the most important official service of architecture in France, is not a member. An International and Colonial Exhibition at Lyons is to be opened in the April of next year, to close in the following November. The restoration of the church of Saint Pierre at Chaillet is just being completed. M. Flandrion, son of the celebrated painter, Hippolyte Flandrion, has been commissioned to execute the decoration of the vault of the choir in this building.

NORWAY.—The municipality of Christiania has invited designs in a public competition for drinking fountains and seats for the parks and squares in the city, premiums being offered of 50, 100, and 150 kr. The jury consists of three eminent architects chosen by the Norwegian Engineer and Architect Association, at the request of the authorities. A huge block of buildings, chiefly artisans' dwellings, and embracing a whole quarter, has just been completed in Christiania. They are four stories high. Some very pretty telephone kiosks are now being erected by a company in various parts of Christiania from designs by Herr Dahl, architect. The kiosks are octagonal in shape and five metres in height. Outside they will be covered with advertisement glasses, whilst inside, in addition to telephones, there will be available barometers, thermometers, guides, &c. On the top will be a clock with four dials, lighted at night. The great machinery buildings of the Christiania Electric Tramway Company are now nearly completed, and the making of the machines has been commenced. The municipal authorities of Bergen have granted a sum of 60,000 kr. towards the building of a permanent exhibition house of industries and arts in that city. As the additional funds required have also been subscribed, the building will be commenced at once. A new church has been opened in Asak, designed by Herr Subrke, architect. It is a structure of red bricks and granite, capable of holding about a thousand persons. An interesting ruin is now being excavated in Norway, viz., the old fortress and palace of Steinvikholm, situated on an island in the Thronhjelm's fiord, and built by Archbishop Eystein in the fifteenth century, but subsequently destroyed by fire. The ruins are said to be worth a visit. The palace must have been one of the finest in Norway of that day, and the fortress a very strong one. The principal hall, the "Bishop's Sal," is 80 ft. in length and another 60 ft. The towers and walls are very massive. What is of particular interest to architects and archaeologists is that the stones are of the same kind, and bear the same marks of the stonemasons as those of the Thronhjelm Cathedral, from the then ruins of which they have no doubt been taken by that worthy ecclesiastic for his residence. Naturally a large number of antiquities, arms, &c., have come to light, the most interesting being perhaps majolica, tiles, and remnants of stained glass windows. The excavations are being carried out under a State grant.

MISCELLANEOUS.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—On Friday, September 22, this Society visited the new improvement works of the London and India Docks Joint Committee at Blackwall, now in course of construction from the designs of Mr. H. F. Donaldson, M. Inst. C.E. These works are of considerable importance, as on their completion vessels drawing 20 ft. will be able to enter the docks. The works consist of enlargements of the old lock entrance from the Thames, and of the two cuts that give communication between the Blackwall Basin and the Import and Export Docks. These cuts will be increased in width from 45 ft. to 60 ft., and increased in depth from 25 ft. to 30 ft. A new engine and pumping station will be built, the docks deepened, and a new swing bridge constructed. The party were shown over the works by the contractors' agent, Mr. A. Beale, the contractors being Messrs. Lucas & Aird. Among those present were the President of the Society, Mr. R. Bolton, the Hon. Sec., Mr. E. H. G. Brewster, Mr. A. Woolheim, Mr. Millington, Mr. Spark, and Mr. Adams.

THE FRENCH STRIKE.—The books of the mining concerns in the North of France, says the *Western Mail*, show that the colliers in that region have been receiving from six to eight francs per day, so that in respect of wages, at least, they had no sort of justification for going out on strike. Indeed, according

The Builder.

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ILLUSTRATIONS.

The Ancient Cathedrals of Scotland: IV., St. Magnus, Kirkwall.—Drawn by Mr. Alexander McGibbon. *Double-Page Ink-Photo.*
Plan of St. Magnus, Kirkwall.—Drawn by Mr. Alexander McGibbon, based on plan by Sir Henry Dryden. *Double-Page Photo-Litho.*
St. Matthew's Church, Morningside, Edinburgh.—Mr. Hippolyte J. Blanc, Architect. *Double-Page Photo-Litho.*
Cartoon for Window, St. Helen's, Seplton.—By Mr. F. Hamilton Jackson. *Double-Page Ink-Photo.*

Blocks in Text.

Sketches in Kirkwall Cathedral: by Mr. Alexander McGibbon. pp. 261, 262, 263, 264. 1 Plan of St. Matthew's Church, Morningside, Edinburgh. p. 265
Diagrams illustrating article on Geology (Student's Column). pp. 266, 67

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The Arts and Crafts Exhibition.



HE present exhibition, opened this week at the New Gallery, serves to confirm the opinion we expressed in regard to the last exhibition of the kind, that it

would be much wiser not to attempt to keep it up annually. In such cases the difficulty of finding an adequate amount of furniture and decorative work of a high class to fill the rooms each year inevitably leads, as the last Arts and Crafts Exhibition too clearly showed, to bringing in the element of trade display and going to large dealers to supply a sufficiency of exhibits which cannot be kept up by other means. For it must be remembered that the theory on which the Arts and Crafts Exhibitions are based, viz., that all work should be exhibited under the names of the people who actually designed and executed it, and not under the name of a firm which deals merely in such articles—though a most wholesome one, is one so opposed to the habits of the day in regard to the manufacture and sale of furniture and fittings, that there is no very large store of design and workmanship to draw upon, and it becomes necessary to allow some time for the evolution of new ideas and new work, if the interest of the exhibitions is to be kept up to the level promised in its first and second years. The exhibition has now been dropped for two years, and the one at present open is a very good one, in which the trade element is, at all events, not predominant. There are one or two cases of articles by well-known firms, it is true, who specially pose as art-producing firms, but who would probably have no objection to give the names of designers and workers if they had been specially asked to do so; and we cannot help thinking that in these cases there has been some carelessness on the part of the committee. As the Arts and Crafts professes to represent personal work, this principle ought to be carried out rigidly. We observed, too, on private view day, a case filled with *priced* articles—a practice

which would at once convert the exhibition into a furniture and *bric-a-brac* bazaar; but we were glad to observe that these obnoxious price-tickets had been removed on the public opening day.

The furniture designs are those which, of course, come most directly within our province, although in one sense they are less so here than in many other collections, for a reason which is in itself a gratifying one; they are not imitative of architectural forms. Not that we necessarily scout the introduction of imitations of architectural forms in the more sumptuous class of furniture design, provided the detail is modified so as to be suitable to its position and the material used. But for good furniture for ordinary use rather than for show we want design which arises naturally from the material out of which the thing is made and the use to which it is to be put. It is in this respect that the influence of the Arts and Crafts Exhibitions has been and continues to be very wholesome. It shows us examples of furniture which in design professes to be nothing but furniture; in which a table-leg is a table-leg and not a column or a baluster; and which nevertheless are designed so as to have artistic interest and expression. Among these some of the best are those designed by Mr. Reginald Blomfield, an architect who has shown a special faculty for furniture design. His inlaid sideboard (12), made by Mr. G. A. Mason, is one of the best things in the rooms, simple and suitable in form; the inlays consist of three conventional flowers in the back of the sideboard, of which the side ones are admirable in outline and effect; the centre one, a rose, not so successful; the rose is too sumptuous a flower, and one in which outline has too little a place, to be successfully conventionalised. The small chequer inlay diaper which forms a surface ornament is original and effective. By the same designer is a rosewood settee made by Mr. J. Urand (175), a cane-lined seat of ample depth, the arms at the ends worked with a bold and effective sweep, the whole depending almost entirely on form and good workmanship for its effect. Mr. Blomfield's "Print Cabinet" (150) by Mr. Mason, is boldly treated in inlay in oak, walnut, and

ebony; we do not like the form so much as in the other examples, nor the effect of the black inlay down the middle of the fronts of the drawers, which does not seem to have any reason.

All these, however, show the hand of the architectural designer, though there is not an architectural detail (in the usual sense) in them; and it is this particular hand that we want in furniture design. We seem to miss it, for example, in the cabinet in Italian Walnut (93) designed and carved by Mr. G. Jack, the joinery by Mr. W. Thatcher. The best portion is the long lower panel of very freely and boldly treated flat foliage; but the transition from the legs to the body of the cabinet is awkwardly managed, or we might say not managed at all; there is a break as if the two parts had not been made for each other. Among the simpler things in which the architect's hand is very apparent is the "Oak Writing Cabinet" (85) designed by Mr. Charles Spooner, and executed by Mr. W. Hall and Mr. W. Randall. This is very plain though solid work, and depends for its interest as design mainly on outline; notice especially the shape into which the sides are cut, with the wavy line at the top, and the lines on which the front of these side-pieces is worked. The care given to line in these small details is just what separates a plain piece of furniture like this from ordinary joiner's work. The same quality of line and shaping is shown in the oak arm-chair (27), designed by Mr. Lethaby.

In some of the furniture we find rather too great a tendency to the virtue of plain solidity. The piano (240) designed by Mr. W. F. Cave and executed by Mr. C. Beckstein (we rather doubt if "executed" is correct here) has a decided practical result in the management of the candle-holders. These are usually metal brackets attached to the front, with the double disadvantage that the light cannot be got at a convenient angle with the book, and that almost invariably these metal appendages are liable to rattle and cause annoyance to the player. In this piano they are fixed on a continuation upwards of the front legs of the piano, which rise past the keyboard to the level required for the candles. Thus they form a part of the solid framework of the case, and stand

well out in front of the instrument. But considering that a piano is generally a piece of drawing-room furniture, is not this one somewhat too heavy, too massive, too straight-lined for civilisation? It is more like a very well made and rather costly "cottage piano," too costly for such a purpose, and hardly refined enough in appearance for the *salon*. We find the same fault with Mr. Voysey's "Lady's Work-cabinet" (134), executed by Messrs. W. Hall and J. Wall, hinges by Mr. W. B. Reynolds, of the "Wood Handicrafts Society" (it is not easy to see what this society specially has to do with decorative brass hinges). This is a fine solid piece of furniture, of original design, and convenient in arrangement; but we demur to the idea that it is specially a "Lady's" cabinet. It is too square and too heavy for that. A piece of furniture intended specially for a lady's use should surely be marked especially by grace of line and comparative lightness of parts and construction, which is certainly not the case here. Mr. Macartney's "Escritoire" (105), made by Mr. J. Hall, and not described as a lady's piece of furniture, is obviously and appropriately such nevertheless. It is light, elegant, graceful, though of thoroughly sound make; the design of the legs and feet is particularly good. The plain leather-seated arm-chair, designed by Mr. W. H. Bidlake and Mr. Arthur S. Dixon (183; we do not quite see where was the necessity or the chance for two designers), and made by the Birmingham Guild of Handicraft, is a good piece of plain unpretentious work. Near this is a large and sumptuous "Linen-press" (184), designed by Mr. Lorimer and executed for Morrison & Co. by Mr. A. Paterson, of inlaid walnut; an excellent piece of workmanship—the drawers most honestly fitted and finished; it is embellished on the top and bottom rails with inlaid swans in white wood which are cleverly contrived to appear to float upon the sinuosities of grain of the walnut wood. There is no particular point in this decoration, but it is more satisfactory than what Mr. Lethaby calls the "coarse inlay" of his oak chest (147), in which sheep are inlaid in rather rude outline with their legs cut and inlaid separately in a very primitive fashion. We remember this or some work of the same kind in one of the Kenton Society's exhibitions; it hardly commends itself to us. If animals are introduced at all in inlay, we should like to have something a little less "wooden" than these. Nor can we quite make out the charm of the same clever designer's "Door for a Nursery" (225). Why this disagreeable green tone, and why paint the tiles with an apparent imitation of metal bandaging? This is surely initiating the children's mind into the idea of sham construction or sham material, which they will learn soon enough.

On the other hand, Mr. Lethaby is at his best in his original and refined design of a "Marble Chimney-piece" (42), executed by Messrs. Farmer & Brindley. To carry out the principle of the exhibition thoroughly we should have had the names of the men in Messrs. Farmer & Brindley's employ who made it; and we fear we should have felt called on to complain a little as to the bad joining of the thin slabs which form the sides and top; not very good workmanship. The design is exceedingly simple and restrained, but quite original and a thorough piece of architect's work. In the flat portions an effective use is made of the contrast of slabs of white and grey mottled marble. Among other pieces of work connected with the fireplace we have the "cast-iron grate," with beaten and polished lintel, designed by Mr. G. Jack and executed by Messrs. Longden & Co., "assisted by W. Middleton, W. Vickers, W. Bullas, and W. Knowles;" a very good and effective piece of work. Over this is Mr. G. Jack's "chimneybreast" (168) in modelled and coloured plaster, divided into panels each of which contains in the centre a coloured study of a flying sea-bird in bas-relief; these birds are very carefully studied, and the whole forms a

most suggestive and poetic kind of ornament for a seaside house. The "Chimney piece in carved alabaster" (176) by Mr. H. Wilson and Mr. F. W. Pomeroy, looks as if it was intended for Welbeck Abbey, from its general similarity with the style of decoration of the Welbeck Abbey Library (illustrated in the *Builder* for September 23). The carving is executed in a flat relief which is very pleasing to the eye; the colour produced by inlays and voussoirs to the chimney arch is rich in effect; it rather strikes one, however, as if colour and texture had been more thought of than form; the whole seems rather square and heavy in effect, and we do not see the relation in design between the main portion of the work and the erection over it, variegated with inlaid discs in dark marble.

In speaking of the furniture properly so called, we should not have passed over Mr. Alma-Tadema's fine and classical-looking "Studio Seat" (84), a low broad settee without back or arms, with short heavy moulded supports, and diversified with inlays of mother-of-pearl and other material. We fancy we have seen this in one of the artist's paintings. The plain leather straps which confine the wide cushion seem a little out of keeping with the richness of the rest of the work, as if they wanted some little stamped surface ornament to bring them into place.

One of the most important exhibits, and one of the greatest interest, consists in the series of drawings illustrating Mr. W. B. Richmond's designs for the colour decoration in mosaic of St. Paul's Cathedral. Two of the full-size cartoons are hung in the central hall: this is hardly the place to judge of their effect, as the space is not great enough, and they are too near the eye, and lose also by being dissociated from their proper architectural framework. It is from the series of small "First Sketches" (54 to 69) hung in the west room, that we can best form an idea of the artist's intention. This is a fine piece of work and worthy of the occasion. The semicircular lunettes are treated with a figure at each side, in most cases, and the intervening space (partially occupied by architectural detail) filled up with symbolic decoration. Thus, in the Annunciation, which forms the subject of one lunette, we have the announcing angel standing on the left of the compartment and the Virgin (a beautiful figure) on the right; other subjects, the "Expulsion from Paradise" for instance, are treated in a similar manner; the angel guarding the gate (a grand figure) on the left, Adam and Eve on the right. The posing of the figures is probably dictated by the nature of the subject and the feeling to be conveyed. Thus, while the angel and the Virgin in the first-named subject naturally face each other, or nearly so, in the Expulsion the guarding angel has his back to the two retreating figures on the other side. The Delphic Sibyl, one of the full-size cartoons (of which the small sketch is also exhibited), is almost inevitably based to some extent on Michelangelo—one could hardly escape that; and the subsidiary genius appears as if his action had been suggested by that of the Bacchus in Titian's immortal painting; but it is none the worse for that. The sketch for the centre east window looks as if it would work out into a fine thing. It is very Blakian in conception; the lower portion is occupied by angels standing on spheres (would not these spheres have been better a little larger? they seem scarcely adequate bases for the figures); the middle portion by seated saints and elders of very broad design and dignified aspect; the upper portion consists of a tumultuous grouping of angels whose wings and raiment form a climax of rich colour. This is a stained glass design perfectly suited for a Renaissance church, in style and feeling, and yet suffused with a glow of colour characteristic of Mediaeval glass. The proposed treatment of the clearstory windows, of which two drawings are shown, is also exceedingly satisfactory;

these are grisaille windows filled with decorative design only, the centre portion with Renaissance scroll-work, the borders with interlaced patterns of a Byzantine type; this also is sufficiently in keeping with a Renaissance church, while better fitted for stained glass treatment than a border of orthodox Renaissance pattern would be. Taking this set of designs as a whole, they afford matter for pleasure and satisfaction for all who are interested in the noble national work of the decoration of St. Paul's Cathedral; they promise that something is to be achieved which will be both fine and interesting in itself and effective as a work of decoration; and if the result in the execution in mosaic is equal to what the drawings convey, both the artist and the public may be congratulated.

Among the designs for window-glass is Mr. Holiday's cartoon (51) for the lower part of the new west-window in St. Saviour's, Southwark; subject, "The Creation." This is a remarkable and unusual treatment, the subjects being divided into a series of square panels, and treated in a highly conventionalised form, specially suitable for stained glass. This design should be studied, for it is quite out of the usual run of modern stained glass design, and shows very well how subjects of great significance can be reduced to a symbolical and conventional form, so as to be perfectly intelligible and yet as far as possible removed from anything, in the nature of a picture. Mr. C. W. Whall exhibits two cartoons of finely designed figures of Eve and St. Michael for glass at St. Mary's, Stamford; the St. Michael perhaps a little too much suggests a man in armour rather than a celestial power. Rossetti's series of designs for glass representing the "Story of St. George" (6 to 11) are interesting but very curious in drawing. By Mr. Burne-Jones there are some cartoons of angels for stained-glass which are of special interest as studies of drapery, treated with the stiff monumental lines which are so suitable for glass. Mr. Selwyn Image's cartoons for domestic-glass representing "Brownies" (78, 79) are original in idea and in perfectly stained-glass style; the same may be said of Miss Newell's cartoon (34) of the subject of "The Babes in the Wood," also for domestic-glass. Mr. Ford Madox Brown exhibits a series of cartoons for glass for Durham (15-20) illustrating the story of St. Oswald, and a monochrome study for one of his Manchester wall paintings, "The Expulsion of the Danes from Manchester" (2), in which early Mediaeval architecture of rather an imaginary type is cleverly used as the scenic setting.

Textiles are very largely represented, the most notable work being the large subject from a San Graal series, representing "Sir Galahad and the Holy Graal" (89), worked in arras tapestry from the design of Mr. Burne-Jones, by Messrs. Morris & Co. Here also, on principle, we should have had a list of the names of the workers; and it is matter for reflection to find that Mr. William Morris, who is part of the backbone of the Arts and Crafts Exhibition, and who has demonstrated so perseveringly in favour of the recognition of the artisan, nevertheless exhibits work executed by "G. & Co.," just like any of the trading stained-glass or furniture firms: so much for principle and practice. The design is treated, as far as the figures are concerned, as nearly as possible in one plane; on the right is a kind of section of the chamber in which the Holy Graal stands on an altar before adoring angels, and Sir Galahad kneels at the door; Sir Lancelot, we presume, his armour girt with Enid's pearl-sewn sleeve, kneels on the left at a distance, as unworthy to approach nearer. His stern and melancholy figure is the finest thing in the composition. There is a wealth of flowers in the foreground, treated in a sufficiently conventional manner and affording a quantity of beautiful detail and colour; the background is a gloomy wood, and on the left is a rather realistic

beach and shells, backed by very conventional waves which have not at all a happy effect. In fact, the balance between conventionalism and realism is hardly maintained at the same level throughout the design. The work is splendidly executed, but the treatment of the most important point of the subject, the angels and Holy Graal, is hardly impressive in a poetic sense, and one cannot help feeling a doubt whether the result is commensurate with the immense labour which must have been gone through to produce it. Among other textile work we may draw attention to a sumptuous carpet in the west room, designed by Mr. William Morris and worked by "A. & Co."; a cream-silk portière (162) executed by the Royal School of Art-Needlework (no designer's name); a set of dessert doilies (158-9) designed by Mr. Walter Crane (no worker's name) and representing "Flora's retinue," which are charming; a portière (166) designed by Mr. Aymer Vallance, and executed by the Misses B. Hugget, B. Savage, and B. Fisk, which is original both in design and in colour effect, the centre forms in white line, in the flowers, having a very sparkling effect; a piano-back (107) in embroidered satin, with flowers and leaves *appliqué*, designed by Mr. Reginald Hallward and executed by Miss Edith Bloxam, very rich in effect; and a curtain and valance for a bed-hanging (200), worked by Miss Lily Yeats and Miss Ellen Wright from the design of Mr. William Morris, is a beautiful piece of work, diversified by a quotation from a charming little poem by the designer. There are other good pieces of textile work which we have not space to particularise. At one end of the north gallery are some good specimens of wall-papers by various designers, two fine ones designed by Mr. Lewis F. Day (233-4), and one rather curious and original design, "The Vine," a printed wall decoration in tinted lacquer (235), designed by Mr. Heywood Sumner and executed by Mr. W. Bottomley (Messrs. Jeffrey & Co.). This is a striking piece of work, but placed all round a room it would have rather too much the effect of cutting the wall into a series of vertical stripes.

In the central hall we notice among other things of interest Mr. H. Wilson's font and altar-cross for Welbeck Abbey, both good and original; a point in the cross is the form of the plan of the base, oval in its general proportion. We should have rather liked the cross better without the thin and rather fragile-looking tracery ornament surrounding the ends of the arms, which seems not quite in keeping with the solid character of the rest of the work. In the central hall also is a fine bronze memorial tablet to the memory of the late J. D. Sedding, by Mr. F. W. Pomeroy, two draped figures in relief supporting a tablet with a low-relief portrait of the late architect on it, which has the merit of being a very good likeness, while the general composition of the whole is very harmonious in line. Another very interesting exhibit in the central hall is a stand with two or three of Sir F. Leighton's models made to assist in the composition of his pictures, including a complete sculpture sketch, as it may be called, for the Perseus and Andromeda.

Among interesting works which come under no special class we may draw attention to the drawing by Mr. Walter Crane of a design for a shield presented by the *Daily Chronicle* to the London Schools Swimming Association (38); the shield, of a very graceful external outline, is bordered with aquatic emblems, and in the field in the centre are two youths swimming, who appear, by the way, to be swimming "side-stroke" on their faces, but that is a detail which does not directly concern the artistic effect of the work. The painted designs for two fans (215-6), by Miss Mary Sargent Florence, are exceptionally good in design, and show a fine feeling for colour.

The south room is mainly devoted to books, binding and printing, and studies for book illustrations, many of which latter, by well-known artists, are of much interest.

Mr. Cobden Sanderson exhibits a case of books (414) "bound by the Doves bindery," "to wit, designed by T. J. Cobden Sanderson, printed by Charles McLeish, forwarded by Charles Wilkinson, sewn by Bessie Hooley, clasps by Douglas B. Cockerell." This is a conscientious carrying out of the principle of the exhibition. Many of the bindings are beautiful, but we do not know that any are better than the one in the next case (415), of "Elizabethan Lyrics," designed and tooled by Miss Irene Nicholls. However, there is scarcely a binding in these two cases which is not good of its kind. The three cases of books "printed at the Kelmescott Press" suggest a question which other things in the exhibition also suggest—whether it is not possible to go too far, and to defeat the real ends of work, in the too ardent striving to be "artistic." Literature, for example, is literature, not design, and the printing of books with the type and borders and initials all arranged to produce an artistic result to the eye has somewhat the effect of putting the ornamental element before the literary. For example, we find Tennyson's "Maud" printed in capitals and with the lines, as printers say, "run on," *i.e.*, not divided obviously into lines, but looking to the eye like prose. This is an utter mistake; no great poet would ever want his work printed so; the literary form should be clear to the eye as well as to the ear. This is one example of a tendency to excess in the endeavour after artistic form.

We may add that a feature in the exhibition is the illustration of the operations of printing, and of the making of blocks for wall-paper, carried on by artisans in the south and north rooms, so that the processes can be studied in operation. In regard to the wall-paper printing this is of considerable interest, and is evidently found to be so by visitors.

We congratulate the Arts and Crafts Society on a very varied and interesting exhibition.

NOTES.

IT is interesting to architects to find that a debated question as to the date of important sculptures may have to be tried in an architectural court. Such appears to be the case with the remarkable works of art found at Lycosura, and recently, in part, published by Mr. Kabbadias. They have enjoyed a double prestige, as the first and only works we possess from the hand of the great sculptor, Damophon, of the fourth century, B.C., and as echoes in stone of the style of ancient elaborate *roana*. This last prestige they will retain, but it seems that on architectural grounds we shall have to attribute them, not to the fourth, but to the second or first century, B.C., to late Hellenistic or Roman times, and that hence Damophon, whom Pausanias distinctly states to have been their sculptor, must follow suit. At this last expedition of the German School to Peloponnesus, Lycosura was visited, and the masonry of the temple carefully examined. The temple consists, it will be remembered, of a cella with pronaos, the cella containing the basis of the great cultus group, which is still *in situ*—the statues have been removed to Athens. This basis is of limestone, of exactly the same sort as that which forms the lower portion of the cella walls. The upper portion was of brick. The columns and parastades of the pronaos and the architrave and *sima* of the whole building are of coarse white marble, the same material as the sculptures; the material came apparently from Doliana, near Tegea. The general style of the work and the character of the ornament employed are Roman throughout, and the basis of the statues, as well as the rest of the masonry, show uniformly the late Γ -shaped clamp. Everything seems to point to their dating from the same period. An attempt has been made to save the fourth-century date of the sculptures, and of Damo-

phon, by supposing that the sculptures belonged to an earlier structure, and that the temple was rebuilt. Of any such early structure there is not the smallest trace, if it existed; to have perished so completely it must have been in superstructure entirely of brick and wood: this, considering the elaborate character and marble material of Damophon's statues that were to be housed in it, is most improbable. It is satisfactory to find that some critics who have examined the original marbles at Athens have always inclined to a Roman date.

ONE of the most practical steps towards the solution of the coal difficulty is the endeavour which is being made by the Mayor of Sheffield to bring the disputants together. But for the serious character of the crisis, their present attitude would be almost laughable. The coalowners in conference issue a manifesto intimating their willingness to meet the men with a view of discussing "the proposed reduction"; adding that they are desirous not to raise false hopes by meeting the men upon any other basis. The Federation formally reply that they are not willing to meet the owners on this ground, "so that no false hopes may be held out." As we are now in the tenth week of the struggle, it might well be supposed that both sides are anxious to come to terms, and ready to welcome any suggestion which may lead to an interchange of views. The first step taken by the Mayor of Sheffield was to convene a meeting of the Mayors of some of the towns in the districts principally affected, at which they resolved that a deputation of representatives of both sides be invited to meet them at Sheffield on Monday next, with a view of finding and agreeing upon the mode of settling the dispute. It is added that the municipal representatives will be prepared to lay certain suggestions before the conference in the hope of bringing about a settlement. Such a conference as this both coalowners and miners can attend, without retreating in any degree from the position they have seen fit to take up; and it is sincerely to be hoped that the meeting may lead to good results. Although a good many more men have resumed work this week, the output is, of course, very far short of the requirements of the country; and the relief afforded is, at present, chiefly local. All will join in wishing the Mayor of Sheffield and his colleagues every success.

SIR COURTENAY BOYLE, speaking before the Associated Chambers of Commerce at Plymouth last week, gave it as his opinion that bodies such as those he was then addressing could do much more for British trade interests than the Board of Trade. He maintained that if the wisest men amongst them were selected to form a State department, that State department would not be so useful as the Chambers of Commerce. The fact is that the Chambers and the Board of Trade are equally indispensable to the trade of this country, and should work hand in hand. The railway rates question furnishes an instance in which the public are indebted to both these bodies, the traders being, at the present time, in a far better position than they would have occupied but for their persistent action. More still remains to be done before this question is finally settled, and several resolutions bearing upon it were introduced at the Plymouth conference. These included resolutions approving of the creation of a tribunal for determining what is or what is not a reasonable rate; and also the formation of public trusts for the acquisition of waterways, with power of compulsory purchase of canals now under the control of railway companies. With regard to the former point, the President of the Associated Chambers described the existing Railway Commission as being all that a tribunal ought not to be—cumbersome, costly, and limited in jurisdiction. There is

every probability that Mr. Shaw Lefevre's Committee will recommend some reform in this connexion, the demand for it being so widespread and the necessity so apparent. The question of arbitration and conciliation boards naturally entered largely into the deliberations of the Associated Chambers, resulting in the adoption of a resolution affirming the desirability of investing the Board of Trade with such authority as may be necessary to settle labour disputes by conciliatory means. This is essentially a matter in which the Chambers and the Board of Trade must co-operate. No one interested in the commerce of this nation, of whatever shade of politics, can fail to regret the "shelving" to which this important matter has been doomed in the House of Commons. There is at least a possibility that the coal dispute would never have grown to its present proportions had the Bills which have been introduced on the subject been debated, amended where necessary, and borne such practical fruit as the promoters designed.

DR. MACLEAN WILSON'S Report to the Local Government Board on the Sanitary Condition of the Whitby Rural Sanitary District, dated August 9, refers especially to the arrangements for the discharge of the duties of Medical Officer of Health, but gives some details as to the sanitary condition of the villages on the coast which ought to be of interest to those who like the neighbourhood of Robin Hood Bay as a seaside resort. The following information (amid many other details) is gleaned from the Report. In the seaside villages the houses are generally built on a steep slope, and very many of them have the earth heaped up on their back walls even as high as the eaves. Sewage is disposed of in the district by running it into the nearest watercourse. Any sewers that have been constructed are short lengths meant only to carry the sewage past houses. In many cases these sewers discharge by the roadside, where pools of putrefying filth are formed in summer. In many of the farmyards there are good examples of the old farmyard midden, where farm manure, ashes, house refuse, and slop water are all thrown into a hollow in the soil, without foundation or covering, and without drainage. A large number of the cottages, especially those in the seaside villages, have no privy accommodation. The ordinary form of these structures is that of the pail-closet in the seaside villages and of the old midden-privy inland. In the pail-closets no earth is used, but all the house refuse is emptied into them, and as many of the cottages have no gardens, and the Authority have not undertaken the removal of refuse in any part of their district, the disposal of the contents of these closet pails is a matter sometimes of difficulty. The closets are frequently of wood, with wooden or earthen floors, and the privy-middens of dry stone, large, deep, and uncovered, sometimes without retaining walls, and always with the bare soil underneath. There are innumerable good springs of water all over the district, issuing from between the beds of sandstone and shale, so that there is not a single village which need be without a good supply. In spite of this, very few of the villages are well supplied. Many are dependent on pump-wells belonging to farm-houses, or on roadside dip-wells, sometimes at a great distance from the houses. Instances are not uncommon where all drinking and cooking water has to be fetched a distance of a quarter of a mile. Pollution of the streams is common all over the district. The Authority, when laying down any new sewer, seems quite content if able to discharge the sewage into the nearest stream. The improvements carried out are never of a comprehensive character, and relate only to the removal of nuisances. For example, in Robin Hood Bay the sewers have in many instances been relaid, but they have all been carried directly into the beck, which remains

as foul as ever, although many complaints have been made as to its state. There, too, the removal of house refuse has been attended to so far as to provide public middens (of bad construction) and shoots over the cliff. But the middens themselves, and the shoots as well, create nuisances which are frequently complained of. Evidence of this dilatory and inefficient action of the Sanitary Authority is also shown by a comparison of the recommendations of one of the Board's Inspectors in 1885 (*see* the Appendix) with the results achieved at present. Very few of these recommendations have been attended to, and they might be repeated almost word for word with reference to the present state of the district.

THE "Journal" of the Franklin Institute for September contains a useful paper upon the subject of artesian wells, in which the author, after reciting the trite saying that the two principal questions to consider in artesian water are the quality and the quantity, states, first, as regards the quality, there can be no doubt that water which filters through from 200 to 500 ft. of rocky strata is free from all deleterious organic matter. Those stratified rocks which are highly jointed, fissured, and porous, furnish many easy channels for the passage of rain-water to strata situated at great depths, while beds of clay, clay slates, fine-grained sandstones, quartzites, and compact mica schists make very good confining beds. The author combats the popular error which asserts that a well is of little interest unless it be a deep one, and that the deepest ones furnish the most water. Shallow wells often yield enormous quantities of water. The object of drilling a well being to obtain water, it is a useless expense to drill deeper when an abundant supply is reached at a moderate depth. The author next inquires what kind of rocks yield hard water and what kind soft water. Whether a water be hard or soft depends mainly upon the composition of the soil and rocks through which it filters. Water that passes through calcareous or magnesium rocks of great thickness will probably be hard, while water that passes through rocks composed of silica, alumina, iron, potash, or soda will probably be soft. The great deposits of limestone, marble, gypsum and other calcareous rocks, as well as the magnesian rocks, such as dolomite, chlorite, and talcose schists would then yield hard water. This is, in the main, true, although there are some exceptions which local conditions modify. Some sandstones will yield soft water, while other sandstones furnish hard water; it depends mainly upon the cement which binds the grains together. If the cementing material be carbonate of lime or sulphate of lime, the water will probably be hard, especially if the well be of great depth and the water be long in contact with the rocks. If, on the other hand, the cementing materials be felspar, such as orthoclase or albite (not labradorite) or even gelatinous silica, the water will probably be soft.

IN the Surveyor's Annual Report to the Vestry of the Parish of St. Luke we notice that special attention has been paid to the cleansing, refilling, and disinfecting of the street gullies. One water-van has been exclusively employed in refilling the gullies after emptying them and flushing them, together with the surface ventilators, with a strong solution of carbolic acid and water. The whole of the gullies and surface ventilators throughout the parish are by this arrangement flushed and disinfected on every alternate day. An important item in the Report is a long paragraph dealing with the question of disposal of refuse, especially in regard to wharf premises. The Surveyor says:—

"It is not only the house refuse that has to be considered, for trade refuse, street sweepings, and slop are equally difficult of treatment, and are not properly dealt with are quite as likely to prove as

serious a danger to the public health as the much talked-of dustbin. I know that some of the trade refuse which has to be dealt with in this parish is of such a nature that it decomposes and throws off a most sickening effluvia in less than twenty-four hours, and I have seen trade refuse brought on to the wharf that has fired whatever it came in contact with of a combustible nature. I may mention it is not unusual to receive application from firms to send a van at once to remove a load of trade refuse. This, I think, shows beyond a doubt the real necessity for a more speedy and also efficacious method of dealing with the whole question of disposal.

In seeking for and selecting the means by which it is hoped to obtain the desired result, I would suggest that the system and data only which have been proved in actual practice and can be still demonstrated, should be considered; no fancy or intricate method which has not stood the test satisfactorily should be entertained by any public authority, and experimenting should be left to the scientist, or the result may prove both a loss and disappointment.

The old outlet by means of carting or barging to shoot is in many instances entirely closed, and in others the shoots still available are situated at too great a distance to be of service.

Many public bodies are endeavouring to find a solution of the difficulty by erecting destructors. This is the method to be adopted in the future (and such appears to be the general opinion), there are a few points worthy of careful consideration before deciding on any particular form of furnace, *i.e.*—

- That sufficient means are provided at the beginning to entirely prevent the possibility of accumulation.
- That complete combustion takes place in the furnace by the means of a strong draught through; and this, I would point out to the vestry, is the weakness of, and my objection to, the system of piece or load work.
- That the fumes previously to entering the shafts are rendered innocuous, and that the whole work is carried on without nuisance.
- That the means of procuring such a result are not too costly.

The furnace most likely to accomplish this will, in my opinion, be found to be one of simple construction, requiring no skilled labour to work it, and at the same time causing as little wear and tear as may be consistent with efficient working. There are several kinds in the market, some of which I have seen at work. Some of the recent inventions are a kind of mechanized stoker and fireman combined, and it is said that they do away with the large percentage of the labour required to work the destructor, as the refuse is fed into the furnace mechanically and the clinker drawn out by the same method.

Those members of the vestry who have seen and are acquainted with destructors are aware of the intense heat produced in the cells, and it is very doubtful whether any mechanical contrivance can stand in the face of such heat; it is also very doubtful whether these mechanical iron men will be able to manipulate refuse as desired.

In some instances forced draught is applied by the use of steam blast and differently-arranged internal flues. By this last arrangement the steam raised by the combustion of the refuse is used to further hasten combustion by increased temperature. I need hardly remind the vestry that this is a very serious item of expense in the form of greatly increased wear and tear of the whole structure, and also a still greater disadvantage likely to happen at intervals, *i.e.*, the frequent cessation from burning for long periods for the purpose of executing the necessary repairs; further, the steam, which is capable of being usefully and profitably utilised, is employed to increase the strain, which is already sufficient on the buildings, which have been erected at considerable cost, without, in my opinion, producing a corresponding benefit. For the above reasons I suggest these are matters which should receive careful consideration before being adopted.

We quote these remarks by the Surveyor (Mr. Meaby), as they are of general application, and may be useful as suggestions for the consideration of other public bodies which are contemplating the use of destructors.

WE regret to hear of the death, in his eighty-third year, of Mr. William Rendle, F.R.C.S.E., for whom it may justly be claimed that he was the historian of Southwark. For many years he served as the Medical Officer of St. George's, and his residence there enabled him to supplement his extensive researches amongst written records with investigation on the spot, an addition to their inquiries which present-day day topographers are somewhat prone to neglect. Mr. Rendle frequently contributed to *Notes and Queries*, and wrote two standard works: "Old Southwark and its People," 1878, and ten years later, in conjunction with Mr. Philip Norman, F.S.A., who furnished

the illustrations, "The Inns of Old South-west." We reviewed the latter volume on November 3, 1888.

FROM the report of Mr. Norrington, the Surveyor to the Fulham Vestry, it seems that the system of the vestry doing their own work in road-making and re-paving, instead of employing outside contractors, has proved a great success financially. The work of paving a certain section of the Fulham-road and Kyston-road with deal blocks has been done at a cost of 4,791*l.* 1*s.* 9*d.* below the lowest outside tenders, and 437*l.* 1*s.* 9*d.* below the Surveyor's estimate. The whole cost has been 5,388*l.* 8*s.* 3*d.* In another case the actual cost has been 4,299*l.* 15*s.* 5*d.*; Surveyor's estimate, 4,640*l.* If the work has been well done, this is strong evidence in favour of vestries acting as their own contractors.

THE thirty-seventh report of the vestry of the parish of Chelsea, while showing that the practical and sanitary affairs of the parish are very well looked after, does not present much for special comment. We notice a reference to an experiment in paving part of King's-road, near the Police-station, with blocks described as being "made from specially selected vitrified material, impervious to weather and moisture, and fitted with square wooden plugs on the surface." Complaint was made of the noise caused by this paving, but having undertaken to give it a trial for a period of eighteen months, the vestry were reluctant to remove the blocks, and accordingly took no action with regard to the complaint. In regard to another point, the proposal to open a new communication by the removal of a wall separating Langton-street from Victoria-grove, the vestry set a good example in respecting the memorial of the residents in Victoria-grove, pointing out that their residences in that place had been taken owing to its quietness, which by the removal of that wall and opening of the thoroughfare would be destroyed. The invasion of neighbourhoods which have enjoyed a long immunity from the noise of traffic is a serious grievance which is often entirely overlooked in the prosecution of what are called, but are not always, "public improvements," and the vestry showed a wise spirit in respecting the rights of the minority, too often very little respected in these days.

WE were among those who experienced and expressed some disappointment in the design for the Shaftesbury Fountain, mainly on architectural grounds; and we are not therefore speaking from the point of view of bigoted admirers of Mr. Gilbert's work when we give expression to the disgust and contempt which all artists must feel at the letters on this subject which have been allowed to appear in the *Times* during the past week. Mr. J. Russell Endean, whose claims to express any criticism on a work of art we have yet to learn, informs the public on his own *ex cathedra* authority that the fountain is one of the ugliest erections ever put up; an old maid writes to the *Times* to express her indignation that Lord Shaftesbury should have been commemorated by a fountain with a nude figure on the top; and a landscape gardener is allowed the use of the same paper to inform one of the first artists of the day that he "has no idea of the dignity and simplicity which mark all pure design," especially, no doubt, the designs of landscape gardeners. That some people should be silly and presumptuous enough to write such letters is natural enough; few English people know much about art; but it is really rather astonishing that the *Times* should not know better than to print them. With some drawbacks in the architectural portion of the design, we have for the first time got an object of this kind in a public place in London

which is really an artist's work, and which foreign artists visiting London would think it worth while to see; and all the artist gets for it is to be subject to public ridicule at the hands of persons who have no sort of right to speak on the subject of art at all. But Mr. Gilbert has sinned, no doubt, in doing something original and unlike the ordinary commonplace of modern London monumental erections. Had he erected a square pedestal with a statue of Lord Shaftesbury in trousers and frock-coat, no doubt Mr. Russell Endean and his like would have found their pure tastes amply satisfied.

LETTER FROM PARIS.

THANKS to the intelligent support given by the Directeur des Beaux-Arts, an eminent sculptor, M. Cros, making use of the furnaces and materials of the national manufacture of Sèvres, has just completed a large fountain in *pôtes de verre*, coloured, designed and modelled by himself. The fountain, which will be on view for a few days at the manufactory at Sèvres, is more than two metres high and composed of fourteen pieces. In the upper portion of the design appears a blue sky and the sun in a chariot drawn by white horses. Below is a female torso, finely modelled, emerging from a white drapery, and personifying snow; other allegorical figures are added. In the lower portion is a figure in relief of a young man holding on his shoulder an urn, whence the water flows on to a flowery field, in which is a bas-relief figure of a woman reclining under the trees. The upper part of the base is formed by a wide band of leaves and fruits, with a mask head in the centre, above which is a decoration composed of seaweed and fish; below is a basin, apparently carried by a colossal crab. It is expected that this curious piece of work is to be seen at the next Salon.

The arrival of the Russian naval officers in Paris is at present the principal interest of the Paris municipality, which is preparing an imposing reception in their honour. Besides the fêtes at the Hôtel de Ville, each Russian officer is to be presented with a copy in bronze of the "Paix armée" of M. Coutan. This reproduction of the statue which decorates the "Place d'Anvers" will be accompanied by a reduction in bronze of one of the most graceful productions of the late M. Chapu, "Le Souvenir," the seated figure of a woman which decorates the monument of the Comtesse d'Agout. The "Union des Sociétés de Tir" of France also intends to offer to Admiral Aveilan a copy of the "Gloria Victis" of M. Mercier. Lastly, M. Bouvard, the Inspecteur-Général d'Architecture to the Municipality, who has been commissioned to evolve, if possible, something new in the way of an artistic celebration, has appealed to all the young artists who are desirous of an opportunity of distinguishing themselves; and the scheme of three among these has been accepted. MM. Ferdinand Dubois (sculptor), Paul Froment (architect), and Emile Coudere (decorator), have suggested erecting on the Place de l'Hôtel de Ville, in front of the State entrance, an immense vessel carrying allegorical figures; "The City of Paris," seated, receiving "Russia" as a young girl protected by "the Genius of Peace." At the stern of the ship the helm is to be held by a figure symbolising "Labour." We give the description, without any comment, of this curious project, the actual carrying out of which is a question of the money being voted. The intended receptions may give a certain point and meaning to these rather commonplace efforts of official taste, the product of a somewhat exaggerated enthusiasm which it is said is even to go the length of giving the name of "Cronstadt" to the Avenue du Bois de Boulogne.

To come to works of a more serious and useful nature, we may note that the Préfecture of the Seine has ordered an inquiry into the scheme for bringing the water of the Loing and Lunain to Paris. The intention of the scheme is to convey a considerable addition of water to the reservoir at Montsouris, which already receives the waters of the Varne. These sources of water, which are already the property of the Municipality, represent a daily yield of 50,000 cubic metres of water, and are intended to supply the districts on the left bank. Twenty-five million francs will be required to carry out this important operation, of the detailed works for which we may have to speak later on. In connexion with the subject, meanwhile, we may mention that there arises a second proposal for renaming the Avenue du Bois de Boulogne, long

known as L'Avenue de l'Impératrice. If the proposed name of "Avenue de Cronstadt" would preserve the memory of the cordial reception given to the French fleet two years ago, it is argued on the other hand that the recollection of the services rendered for many years by an able administrator would equally justify the name of "Alphand," which many members of the City Council wish to give to it. But why not leave it its actual name, which has the merit at all events of clearly indicating its topographical situation? If there is a wish, and a very just one, to commemorate Alphand in the name of a new street, there are plenty, in the quarters more especially connected with his work, among which to choose. It must be added that the constant fancy of the municipal authorities for renaming streets—often from merely political motives—is becoming exceedingly inconvenient to the inhabitants of Paris.*

In a few days the classes of the Ecole des Beaux-Arts will reopen; and at the same time will be opened the competitions for the Armand legacy and the Chenavard donation. This last act of liberality on the part of Madame Chenavard is intended to give a premium every year, at the commencement of the period of study, to a student in painting, sculpture, architecture, and engraving, who may be prevented by want of means from completing his term of studies. The Armand legacy was left with much the same object.

Artistic news is rather scarce in Paris at this holiday season. We may remark that the works going on at the Palais de l'Elysée were not only for the repair of the structure, much ravaged by time, but also for the interior decoration of the reception rooms. The "Salle de Bal" especially, built not many years ago, had been decorated in an altogether summary and provisional manner; the tempera paintings savoured too much of theatre decoration, and offered a curious contrast to the elegant decorations of the ancient rooms of the Palace. As the architect in charge of the Palace has only a very limited sum for annual expenditure on it, he could only effect the transformation of the room by degrees, beginning with the ceiling, which will be adorned with three large allegorical paintings; the other decorations will be executed in turn.

We have to record with great regret the death of M. Marie Auguste Flameng, a painter of much talent, who has died at Paris at the age of fifty. M. Flameng was born at Yony-aux-Arches, near Metz. He came to Paris as a young man to study painting in the ateliers of Dubufe and Pavis de Chavannes. His taste led him in the direction of landscape, and above all to coast scenery. One of his best pictures, "Bâteau de Pêche à Dieppe," was bought by the State in 1881, and is at the Luxembourg. Since 1875 he regularly exhibited at the Salon. Among his works that have been seen there may be mentioned "Un Torride Mer à Saint Vaast"; "Le Varch"; "La Sortie d'un Trois-Mâts au Havre"; "La Tamise à Londres"; "Sur la Grève"; &c. This year he sent to the Salon two vigorous sea-pieces, "Marée Basse" and "La Garonne à Bordeaux." He had obtained a Third Medal in 1881, a Second Medal in 1888, and a Silver Medal at the 1889 Exhibition.

We have to record also the death of M. Louis Eugène Alexis Fanost, architect, who has died at Paris at the age of eighty-eight. M. Fanost was born at Valence (Drôme), and studied in the ateliers of Vaudoyer and Lebas. He was admitted to the Ecole des Beaux-Arts in 1828. He then entered as "Inspecteur" the atelier of M. Renié (at that time architect to the Ecole Polytechnique), and in 1845 was admitted a member of the Société Centrale, of which he was for nearly half a century a devoted adherent. A member of numerous committees, especially that which was charged with the issue of the second edition of the "Manuel des Lois du Bâtiment," M. Fanost took up zealously all work entrusted to him, and put at the service of his colleagues a clear judgment and a remarkable degree of practical knowledge.

A.A. LYRIC CLUB.—We are asked to mention that the opening concert of the season 1893-94 of this club will be held at Coleman's Hotel, Henrietta-street, Covent Garden, W.C., on Friday, Oct. 20, at 8 p.m., when the programme will be arranged by the Committee.

* This of course is quite a different matter from the changes of names which are being introduced in London, the sole object of which is to get rid of duplicate names.—Ed.

THE EAST RIDING ANTIQUARIAN SOCIETY.

THIS society held its first annual meeting at Beverley on September 25 and 26. On the first day the members assembled in the Minster church shortly after noon, and were placed in the competent hands of Mr. John Bilson, F.R.I.B.A., for instruction in the gradual development of this noble pile of buildings, and for detailed description of its many beauties. The vicar subsequently exhibited the plate and books pertaining to the church, and gave an interesting account of their more remarkable features. The singularly well-defined vestments of an ecclesiastical effigy in the north transept attracted much attention. The stole, maniple, and other parts of the eucharistic vestments are represented as embroidered with a variety of coats-of-arms. Over the chasuble is worn the fur hood or amys of a canon. It dates from about the middle of the fourteenth century, but has not yet been identified. Mr. W. H. St. John Hope (Secretary of the Society of Antiquaries) gave a good account of this effigy. Luncheon was taken by most of the party at the Beverley Arms, when the Bishop of Beverley took the chair, and spoke most favourably of the work already achieved by this young society. At three o'clock the business meeting of the society was held in the Town Hall. Rev. Dr. Cox, F.S.A., was re-elected president. Sir Tatton Sykes and four other county gentlemen were added to the list of vice-presidents. The old council was re-elected, and strengthened by the addition of the names of Mr. John Bilson and Dr. Stephenson. The Society also proceeded to elect Sir John Evans, K.C.B., Mr. St. John Hope, Rev. Canon Raine, and Rev. Canon Greenwell as honorary members. The first volume of the Transactions was issued at the meeting to the subscribers; it is a well-printed and well-illustrated volume of upwards of 100 pages. Rev. Dr. Cox then delivered an address on the Gilbertine Statutes, and the life of St. Gilbert, of Sempringham, the founder of the Order. He pointed out that the Gilbertine houses were really establishments of nuns and serving sisters after the Cistercian rule, with a community of chaplains or canons, after the Austin rule, attached to them, who said mass and other offices for the sisters, and looked after the external affairs of the priory. But the nuns kept the money and presided over the kitchen and cellar, which were common to the two sexes. He proceeded to describe in detail the remarkable arrangements for keeping the two sexes absolutely separate, both in church and in procession, and for supplying food, &c. through "turning windows." Mr. Wildridge, Hon. Sec., next gave an account of the early charters of Beverley, which were exhibited by the deputy Town Clerk, Mr. Mills. These charters form a remarkably fine collection, and include a grant by Archbishop Thurston, circa 1115, to the men of Beverley of all the liberties they of York have; this grant shows that a branch of the Hanseatic League was established here soon after the Conquest. This grant was confirmed by St. William, Archbishop of York. There are also original royal charters and confirmations of charters, bearing the seals of Stephen, Henry II., Henry III., Edward I. and III., Richard II., Henry IV., V., VI., and VIII., Philip and Mary, Elizabeth, Charles I. and II., and James II.

At 6.30 there was a largely-attended dinner at the Beverley Arms, with Mr. Bethell in the chair and the Mayor of Beverley in the vice-chair. After a brief toast list, the party adjourned to the Town Hall, where a conversation of the members and their friends (upwards of 100) were present at the invitation of the President (Rev. Dr. Cox). Several interesting papers were read during the evening. Mr. J. R. Boyle, F.S.A., read a paper on the "Pre-Norman History of Beverley," which cleverly and concisely summed up the earlier records and myths. Miss Mortimer, on behalf of her father, Mr. J. R. Mortimer, the well-known Wold barrow explorer, read a paper on a barrow recently opened on Sir Tatton Sykes's property. Mr. W. H. St. John Hope described the various Corporation insignia, kindly lent by the Mayor, including two silver chains of sixteenth-century date, formerly worn by the waits, or town minstrels. The alternate figures of a beaver and an eagle he explained as referring to the emblem of the town of Beverley, and the emblem of St. John, to whom the Minster church is dedicated. His description of the gradual evolution in shape of civic maces, as illustrated by the two good examples pertaining to the town, was most ably done. The snuff-box, of 1709, presented to the Corporation by John Jackson,

who had been mace-bearer for the long period of fifty-six years, was also described, as well as some embroidered cushions for the Aldermen's seats of the year 1690.

Mr. Arthur Leach, F.S.A., then gave a valuable address on the position of Beverley Minster as a great collegiate church. It was chiefly based on the early Chapter Act book of the Minster, dating from 1269 to 1340, now in the possession of the Society of Antiquaries. The great power possessed by the collegiate canons is strikingly exemplified, as, for instance, in the Prior of the Dominicans (of Beverley) begging pardon, on his knees, before the Chapter for having heard the confession of a townsman. The volume also throws much light on the fabric. From the numerous commissions to collectors for the "new work," which begin to be entered in 1309, and become frequent during the next twenty-five years, Mr. Leach concluded that this was the time of the rebuilding of the nave. The Grammar School and its masters are frequently mentioned between 1304 and 1340. Seven choristers were educated free, but the other scholars paid fees. Dr. Stephenson then gave a comprehensive description of the varied collection of relics that were found in the streets of Beverley, a few years ago, during the deep drainage excavations. They are chiefly of fourteenth and fifteenth century date. So keen was the interest of the archaeologists that discussions were continued till after eleven o'clock.

At ten the next morning the members met near the railway station for a brief perambulation of the town, noticing *en route* its chief old features, such as the old houses in Butchers'-row, Toll Gavel, the Market Cross, and the old brick gateway known as the North Bar. St. Mary's church was well described by Dr. Stephenson. Mr. R. C. Hope, F.S.A., adding some remarks on the "Minster's Pillar," and Rev. Canon Quirk exhibiting the plate, books, and other objects of interest preserved in the church. After luncheon the members proceeded in waggons to Walton Priory, seven miles distant on the Driffield-road. This was the great feature of the meeting. During the preceding week a large number of men had been at work excavating the site of the old conventual church of this Priory, under the direction of the Rev. Dr. Cox and Mr. W. H. St. John Hope. Walton was the largest and most wealthy of the Gilbertine priories, the only religious order established by an Englishman. Up to the present time there has been no investigation of the sites of any of these houses. At the time of the Dissolution, the prior's lodgings and part of the infirmary cloister were preserved as a residence, and have been uninterruptedly occupied. This block of buildings, though retaining some older work, is mainly of fifteenth-century date. A large oriel window of about 1470 is the most attractive feature. The remains of the church and of the greater part of the conventual buildings were entirely buried in grassy mounds until the last few days. The process of uncovering has revealed the outlines of a fine church of remarkable plan. Its length is 206 ft., and its width, exclusive of the transepts, 51 ft. A longitudinal wall runs from east to west, dividing the whole church into two parts. The south or canons' side is 19 ft. 3 in. wide, whilst the north or nuns' side has a width of 26 ft. 9 in. This wall of partition, about 5 ft. thick, breaks off a short distance from the east end of the choir for an archway, which would be used for processional and exceptional purposes, and which would doubtless usually be closed by doors or a screen. A little further to the west, in the resumed wall, is the base of a curious window, 3 ft. 6 in. from the ground, and having an opening of 21 in. Within this window opening has evidently been one of the turnings described in the statutes. This one would be used for transmitting to the care of the nuns the chalice after mass at the canons' altar. In a small chapel of the north transept was a beautifully-carved canopied tomb, of fourteenth-century work, the carving of which may be favourably compared even with the famed work of the Percy tomb in Beverley Minster. A large number of the broken fragments have been recovered, sufficient to show that it commemorated a knight, parts of whose effigy remain, together with a shield bearing a bend, which may indicate the Scrope family. The tomb itself had been rifled. The south transept has not yet been thoroughly explored, as the work is very tedious, owing to the great amount of chalk rubble, of which the core of the walls was composed, and which covers the whole area to a depth of several feet; but it seems probable that there was a south-west tower in this position. There is no western door

to the nave. From the remains of pillar, stones, and capitals, there seems no doubt that an arcade originally was placed on the partition wall at some considerable height. The great cloister of the nuns was on the south side of the church, and had an area of 100 ft. square. The smaller cloister of the canons was probably to the west of this, but has not yet been investigated. It is proposed to resume the work of excavation next year. The great church was originally begun to be built about 1150, and was much damaged by fire seventeen years later. The foundations of the first Norman church are easily discernible at the east end; they now bear two or three feet of the additional base work and great buttresses of the later Transitional church. The walls throughout are about 6 ft. thick, and have been faced with an excellent strong stone. This stone is full of ammonite, and has marked Whitby characteristics, and is quite unlike the rest of the church building stone of Holderness. The stone used at Walton probably came by sea and thence up the Hull and by a smaller water-course direct to the priory site. Mr. W. H. St. John Hope much interested the large number of visitors by his plain and graphic description of the buildings, and Dr. Cox added a few words. The East Riding Antiquarian Society is to be warmly congratulated on having begun a work of such exceptional interest and value.

ECCLESIASTICAL ART AT THE CHURCH CONGRESS.

ONE may consider that this annual exhibition has now settled down to its final form, and that its difference in its general appearance from year to year will be due only to the building in which it is housed. This year the latter forms a part of Bingley Hall, in which the Congress is being held, and is fairly well suited for its purpose. The philanthropic depots and trade exhibits (with exceptions) occupy the floor, and the loan collection of painted glass-work the gallery. Lecterns, chalices, and church furniture are all there, made according to the most approved patterns, but it must be confessed that they lack the life-giving touch of the artist, who while in touch with tradition, thinks the subject out afresh, and gives it individual expression. They are traditional forms that no longer advance, but have betaken themselves to revolution round a fixed centre. More serious objection may be made to the too naturalistic treatment of certain forms here and there, as in the feathers of an oak eagle-lectern; while the well-fed look of some of the sculpture has destroyed the spirituality of face or—as in the case of a Madonna—the lines of grief expressive of a mother's suffering. A similar remark may be made with regard to several of the figures of the painted glass, where the aim seems to have been to portray pretty girls with flowing hair, but without religious dignity or calm. Were the promoters of the exhibition to ascertain the most notable works of ecclesiastical art and architecture that have been executed during the year, and obtain the loan of the one, and drawings or photographs of the other, the exhibition would become an exceedingly interesting one, and would, moreover, afford valuable evidence of the lines on which the art is moving. It would never then, let us hope, become stereotyped.

In connexion with the present exhibition, it is interesting to note that the revival of ecclesiastical metal work originated in Birmingham. A. W. Pugin was at that time Professor of Architecture at Oscott College, in the neighbourhood, and by a casual meeting in 1837 found in Mr. John Hardman, a button-maker of the town, an enthusiastic coadjutor. In 1845 the business was founded which to-day sends one of the largest and best contributions to the exhibition. Messrs. Elkington exhibit the communion-plate of Liverpool Cathedral; the ornament is elaborate and well executed, but the traceried arcing does not seem the most suitable treatment for *reposited* silver. Messrs. Jones & Willis, Hart, Son, Peard & Co., Thomason & Co., and most of the local ecclesiastical metal-workers are represented. Of Church embroidery, the exhibit of the Decorative Needlework Society is conspicuous for work of a high-class, and, in fact, the exhibit is one of the best in the building. It contains, amongst other works, an altar frontal designed by Miss Mary Gemmell. The whole space of the frontal is well filled with conventionalised vine-scrolls in gold thread, embossed on a background of brocaded silk. Similar in general character is the altar frontal and super-frontal in the Loan Collection, designed by Mr. William Morris, for All Saints' Church, Wilden, and worked in

Japanese gold paper thread and in gold silk from the cocoon, but the vine scrolls are here fuller and older in treatment. The panel of a frontal worked by Mrs. Blagden, for St. Frideswide's church, Poplar, is a marvel of technical skill in embroidery, but the total effect is rather hard. The Loan Collection also contains a selection of abbeys from some of the finest monumental carvers, lent by Mr. H. E. Franks.

Amongst the church plate is a silver-gilt chalice dated 1592, of unusual and refined outline. A delicately chased shield with surrounding wreath occupies one side of the bowl and an inscription runs round the lip, the rest of the bowl as well as the lower portion of the domical shaped paten is ornamented with close radial striae. The base is circular. Another silver-gilt chalice dated 1613, and presented to Welland Church in 1735, is of elegant Renaissance design.

The silver-gilt communion cup and cover A.D. 1676 of the Parish Church of Ashby-de-la-Zouch is a good example of a post-Restoration chalice, and is stated by Mr. Cripps in his "Old English Plate" to be of similar character to that used in Lambeth Palace Chapel, though more ornamented. The bowl has lost the conical shape of the Medieval chalice, the sides being quite vertical. The bowl itself is plain, but round the lower two-thirds is attached a pierced and repoussé silver ornament. The top of the slightly-domed paten is treated in the same way, the design consisting of cherubs. Repoussé cherubs are also attached to the angles of the hexagonal base.

A skull-watch of silver gilt, engraved with the fall of Adam and Eve on one side and the emblems of the Passion on the other, is curious and interesting.

An exhibit of various gems is interesting in another way, but when they are mounted in the most entomologically correct forms of bees and dragon-flies they really depart very far from ecclesiastical or any other form of art, and become vulgar.

MUNICIPAL ENGINEERS AT LEICESTER.

BETWEEN eighty and ninety members of the Incorporated Association of Municipal and County Engineers spent two busy days at the Midland Counties District meeting held at Leicester on Friday and Saturday last. The main object of the visit was to inspect the works which the Leicester Corporation has carried out, at great cost, for saving the town from river floods, improving the ordinary sewerage, lifting the sewage up to and distributing it over a sewage farm, and saving the town from inundation by the storm-waters of its own area by conveying those waters, together with the sewage, to a free outfall into the river below the town. In addition to those works, three destructors were also inspected. Mr. E. G. Mawbey, the Borough Engineer, acted as the guide of his fellow members, for whom brakes were provided to convey them from place to place. On the first day luncheon and tea were provided and served in the overflow chamber of the storm outfall works by the contractors for those works, Messrs. S. & E. Bentley, and Mr. Thomas Philbrick, of Leicester. On the second day luncheon was provided and served upon the beam floor of the engine-room in the pumping station by Messrs. Gimson, the makers of the engines, and two of the four were at work during the luncheon, which was in no way disturbed by any noise or vibration. There was a formal reception at noon on Thursday, at the museum, by members of the Town Council. In the adjoining palaeontological room a large amount of wall space was covered with maps of the town, showing successive proposals for culverts to carry off the town's storm waters to the river, sections of the new sewers, sections of the storm culverts, and cartoons showing the construction of the pumping engines and of the destructors. In the adjoining lecture-hall of the museum—a picture gallery—a meeting was held, Mr. J. T. Eayres, of West Bromwich, in the chair, at which Mr. Davis was re-elected as district secretary. Addresses of welcome were made by Messrs. Biggs and Wallcelys. Mr. Biggs stated that the Corporation had to contend with great difficulties because the town was situated in a valley, and had a very sluggish river running through it. The town had undertaken the engineering works referred to, with the result that the death rate of the town, which used to be above the average for England and Wales, was now below it. At the close of the first day's tour the party returned to the museum and heard a paper by Mr. Mawbey describing what was to be

shown in the two days. The order in which they were seen is unimportant; and it is essential to keep in view the separate character or the relation of the different works. The treatment of the river stands by itself. The storm drainage of a large watershed above the town inundated the lower parts of the town. To remedy this there was constructed a 500 ft. weir; and through the town the river bed was deepened and made straighter. Thus the approach of the storm waters was regulated, and their passage through the town was expedited. In connexion with the ordinary main sewerage, the party descended a flushing chamber by the side of the clock tower in the middle of the town. In this circular chamber they saw the sewage held up in one or two sewers, and the obstruction removed so as to flush a lower sewer. The party also inspected a very considerable length of new sewer constructed on the line of the old one, without interfering with the flow of the sewage. This passed away through drain-pipes laid on purpose beneath the bed of the new sewer. The new culvert, to carry off the storm waters that enter the sewers, begins where the sewage is ordinarily pumped into the rising mains for the sewage farm. The point of junction is the long and lofty brick chamber in which the luncheon was given. It is on a curve, so that one end cannot be seen from the other. Across the middle there is an opening in the brickwork arch which is to be glazed over. A temporary covering of canvas ensured protection against the weather during the champagne luncheon and tea. From the yard of the pumping-station the visitors descended by stairs to the floor of the chamber, into which the mingled storm water and sewage are to be turned just at those times when the bulk of both combined is too much for the pumps to deal with. Then the mouths of two meeting sewers will be opened, and the released volumes will rush into the chamber, spread over its wide floor, and when half the chamber is filled up to the height of a crossing-bar, will flow over that bar down the new culvert for a mile and a half to the river, joining it in such a way that each stream will be an induced current to the other. Riding on a contractor's line from the chamber to the river, the party entered the culvert, and walked back through a considerable length of it. For this inspection it was lighted by hundreds of candles fixed by clay to the sides. This enabled the party to see the character of the work all through. The next step in the inspection was to leave the storm overflow, which is for use at exceptional times, and to go to the top of the rising mains, on the summit of the sewage farm, at an altitude of 164 ft. above the level of the outfall sewer at the pump-wells. Here was seen the immediate effect of the pumping below—the sewage flowing out of the bell-shaped mouths of the mains into the tanks and passing by various channels in different directions over the surface of the farm. Whilst it was admitted that the clay soil was very effectively dealt with, still the sight of the sewage lying in one part upon acres of swamp provoked comments which revived what appears to be a local controversy, as to whether the untreated sewage shall continue to be put upon the land or whether the sewage shall be treated by precipitation. One party hopes for success without precipitation, and another party believes that it ought to be adopted sooner rather than later. The river, the reconstructed sewers, the storm overflow culvert, the pumping engines, and the sewage farm, complete the round of related topics. Outside it are three refuse destructors, with six cells each, in different parts of the town. Some improvements made by Mr. Biddles, the foreman, were shown. One is that the bars under the fire are made to move like clasped fingers, so that one-half combs the other half, and no clinkers can adhere to the bars. There are also arrangements for drying rubbish before it is burned, and submitting the fumes to additional heat.

In the paper which Mr. Mawbey read, he said that his predecessor, the late Mr. J. Gordon (to whom he paid a tribute which was heartily endorsed by the meeting), designed the new main sewerage system of Leicester, the present population of which is estimated at 185,000, while its area, consequent on the boundary extension in 1890, has increased from 3,303 to 8,534 acres.

The Normal Drainage.

The chief feature of the scheme was the division of the town into high, middle, and low level zones, each zone as far as practicable dealing with its own excess of storm-water, instead of the higher districts deluging the lower ones and flooding the cellars. At the local storm overflow chamber for each district a penstock is adjusted so as to admit

forward to the low-level sewers the ordinary sewage and storm-water equal to a rainfall of 2 in. in twenty-four hours. The lines and directions of the new sewers follow as far as practicable those of the old main trunks at such different levels and gradients as are required to obtain the necessary storm overflow for each district. The old sewers in all cases have been abolished, and in addition to the great sanitary advantage of getting rid of the abominable ground pollution caused by the badly-constructed old sewers, their removal secured the interception of all the private drains. The whole of the brick sewers are built with Portland cement mortar in the proportion of 1 oz. of cement to 3 of sand, and have brick inverts, and in all cases where it was necessary to alter the old connecting branch sewers they have been replaced by Hassall's patent jointed pipes; in fact, all new pipe sewers in the town are now being laid with these. It has been found necessary in all cases to lay subsoil pipes under the inverts of the new sewers, not only to deal with the subsoil water, but to carry past the works the normal flow of sewage until the brick-work was complete and private drains connected with the new sewer. Excepting where possible to deliver by gravitation into a lower sewer, the sewage and subsoil water are conveyed to sumps and pumped into the completed part of the sewer, the work in progress being protected by a head wall across the sewer, in which was placed a penstock, which, in case of storms, was opened to carry off the increased flow when the works were flooded. In consequence of the great outcry against open surface ventilators, a number of these had been closed up. The present built area is about 1,925 acres, the length of new sewers in the scheme is about 10 miles, and the estimated cost when completed about 105,000l.

The Storm Drainage.

Hitherto the effect of heavy rain had always been to backwater the sewers over a somewhat considerable area, causing serious cellar flooding, pollution of the soil, and the forcing out of foul air in densely-populated districts. It had for many years been admitted that the best remedy was to convey a good proportion of the storm water to some point in the lower reaches of the river where a free outfall could be obtained. The late Mr. E. L. Stephens recommended this when Borough Surveyor, and the late Mr. Gordon also prepared a scheme for the purpose. Mr. Mawbey prepared a scheme which received the unqualified approval of the Council and of the Local Government Board. Some of the difficulties which have been overcome were—(1) to provide an outfall away from populated places and at once satisfactory for all time; (2) to avoid syphons under the river; (3) to avoid constructing the culverts in embankments along and across the flood areas of the river; (4) to have only one culvert instead of two. The volume due to a rainfall of 2 in. in twenty-four hours, which the main sewers were designed to carry off into the storm outfall culverts proposed by Mr. Gordon from the actual built area in 1886, was 63 million gallons. Mr. Mawbey increased the full discharging capacity to rather over 60 million gallons in twenty-four hours, which would suffice for a rainfall of 1½ in. on double the present built area, and he estimated that as a rule the storm culvert would have done its work long before the floods had risen at all. The present line was selected so as to be as direct as possible, and to bring the culvert below the surface of the ground. The 1,214 yards of tunnel were divided into eight lengths by seven shafts at average distances of 455 ft. At each shaft a steam pump was fixed into a sump, sunk below the invert of the culvert, and the work was kept dry by 12-in. stoneware subsoil pipes. A very considerable quantity of water was met with in the open trench work, and also in one portion of the tunnel. The tunnel is for the most part through red and grey marl, but in one part for some distance the gravel dips down nearly to the invert, necessitating leaving in the upper timbers. The total amount of the accepted tenders was 71,446l. Nos. 1 and 3 contracts amounting to 49,146l. 2s. 7d., being let to Messrs. Bentley, and No. 2, amounting to 22,301l. 17s. 10d., to Mr. Thomas Philbrick. The works were commenced in August last year, and will be shortly completed. Excellent progress had been made, and great credit was due to the contractors for the way in which the work had been carried out.

The Pumps.

At the pumping station the sewage first passes through a coarse screen to intercept large substances, then through a double set of fine screens.

Thence it flows into a middle reception chamber, and on through penstocks into two separate pump wells. The sewage is forced from the pumping station through two 33-in. rising mains, for a distance of about a mile and a half into the distribution tanks at the sewage farm, to a net height of about 163'66 ft. above the invert of the outfall sewer at the pump wells. The dry weather flow of sewage is now about 6½ million gallons a day. There are four engines of the independent rotative compound condensing beam type. The diameter of the high pressure cylinder is 30 in., with a stroke of 5 ft. 9½ in., and that of the low pressure cylinder 48 in., with a stroke of 8 ft. 6 in. To each engine there are two main pumps for the sewage, of the piston and plunger type, one at each end of the beam having a stroke of 5 ft. 9½ in., the diameter of the piston being 27½ in. The two main suction pipes are 3 ft. in diameter, leading from the pump well and screen chamber to each pair of engines, and a steel air vessel 25 ft. 9 in. high by 5 ft. diameter is fixed to each rising main. The air pumps and condensers are of the single acting jet type. The fly wheels, of cast iron, are 21 ft. in diameter, and weigh about 21 tons each. The beams weigh about 15 tons each.

There are eight double-flued Lancashire steel boilers, each 20 ft. in length and 7 ft. in diameter, fitted with seven conical cross tubes in each flue, and designed for a working pressure of 80 lbs. to the square inch. The cost of the pumping-station, exclusive of land, was 54,970*l.*, of which 13,667*l.* was for main building, engine foundations, coal store, and chimney, and 25,286*l.* for the engines, boilers, &c.

The official trials of the engines and boilers, carried out under the personal direction of the Borough Surveyor, extended over eight days. In addition to that, in order to check the quantity of sewage pumped on to the farm, it was discharged over weirs at the farm tanks, and gauged day and night about every ten minutes during most of the pumping operations of the trials. In all the tests three boilers were used to supply steam for two engines.

At the luncheon in the engine-room of the pumping-station, Mr. Eayres proposed, in eulogistic terms, the health of their hosts, and said the engines they saw before them were second to none in the country. Leicester was to be complimented on possessing a firm to whom the authorities could entrust a work so great.

Mr. Mawbey, giving details of the engines, said they could not be beaten for easy, economical, vibrationless working.

Mr. Ritchie spoke very highly of the engines, as did Mr. Santo Crimp.

Mr. Comber, of Kidderminster, spoke in a similar strain, emphasising the silent working of the engines as proof of their excellence and economical working.

The Sewage Farm.

The area of the farm is 1,700 acres, and the area really available for sewage about 1,353 acres. The farm is now dealing with the sewage from about 165,000 of the present population, which equals 122 persons per acre of land available for sewage, the sewage from the remaining 20,000 of the population being at present treated upon the Knighton and Belgrave sewage farms in the added areas. A hundred acres of the land at Beaumont Leys is the freehold of the Corporation, and was purchased at a cost of 13,000*l.*, the remainder being leased at terms which mostly will expire in twenty-three years' time. Generally speaking there is only a foot or so of good friable soil, underneath which are two to three feet mostly of stiff yellow clay, and below the latter blue boulder clay of great depth. Crude sewage, in the absence of chemical precipitation, must first be treated on arable land, and finally purified on pasture or rye grass, and this has been done as far as possible. Each field or area is isolated for separate and independent treatment. The drainage of each except the bottom fields, is separately intercepted by a new pipe four yards from the hedge. The crude sewage is put on to the highest part of each field.

The intercepting arrangements are under such control that the sewage can be discharged over and through the land as many times as may be requisite to effect satisfactory purification. In consequence of the nature of the soil, from 550 to 600 acres of land have had to be sewage at one time. In wet weather it has been ten or twelve weeks before the land could be ploughed, while at Birmingham and Nottingham, and even on the clay farms at Croydon, the land can usually be ploughed in a week. The sludge difficulty is

great. The sewage is so heavily charged and coloured with dye water and shoddy refuse that it is very difficult to clarify. Crude sewage fouls the rye grass, and quickly coats the arable land. The difficulty in drying off has rendered some form of drainage almost indispensable. Notwithstanding enormous difficulties, the effluents have been so good that the river Soar, which, when chemical precipitation alone was in use, was each summer a horrible nuisance for miles down the valley, is now in such a state of purity that it is well stocked with young fish.

Mr. Mawbey himself did not advocate the application of sewage to clay land without previous chemical preparations. The amount sanctioned to complete all at present contemplated is 58,900*l.* for 1,434 acres, or 41*l.* 1*s.* 5*d.* per acre. Under existing conditions, with an increase of about 5,000 per year in population, he was confident that the success of the undertaking will be maintained, no matter what may be found necessary to achieve it.

At a dinner on Thursday evening, Sir Thomas Wright said he believed they had for the present got over the difficulty of persuading clay to receive and purify sewage.

At the visit to the farm on Saturday, Mr. Mawbey remarked that if the farm area had been flat it must inevitably have failed, owing to the nature of the subsoil, but as the land sloped towards the brooks and the river on either side, they were able to intercept the sewage and pass it over the surface until the effluent became perfectly pure. The sewage was put on to soil prepared for it, and the liquid then conducted to grass land, which bore excellent crops. Some of the land, as was pointed out, was under broad irrigation, but in other parts the Committee had laid out what are termed "earth tanks." Here the sewage is carried, and after a week or ten days it is allowed to dry off. The liquid flows on the adjoining grass, and the refuse is then ploughed into the soil and prepared for cropping, mangolds, swedes, or oats, as the case may be. The plan, as Mr. Mawbey stated, is to keep the sewage moving, passing over the land again and again. In this way it was prevented from becoming foul, and it was also continually in contact with the air. The soil might in time become sewage-logged, and if that danger threatened they would have to submit the crude sewage to chemical filtration, and pass the effluent over the farm, all of which might then be brought under cultivation.

Mr. Collins pointed to a field which had already given four crops of grass, and on which a fifth is now growing luxuriantly, and said that had produced 20*l.* per acre this year. They had 2,000*l.* worth of grass already this year, the highest price being 7*s.* 7*d.* 6*d.* per acre. From 5*l.* to 6*l.* per acre was a common figure, and the purchasers cut and carried it at their own cost. Of course it did not do to put crude sewage on grass land.

Mr. Mawbey said the committee were making an interesting experiment. He had no great faith in it himself, but they were trying the plan fairly, and if it succeeded it would be a good thing.

Sir Thomas Wright said they had now abandoned the use of chemicals, and the committee would not re-introduce them unless they were compelled to do so. By the system now being worked they put their sewage first where they needed it, and they ploughed it into the soil with excellent results so far.

At the Saturday luncheon, Mr. Walker, of Croydon, expressed the opinion that the committee were on the right track in the operations they were pursuing at the sewage farm, and that success was nearer than some seemed to anticipate. They had everything to encourage them in the state of the place, and in a few years they would see a still further improvement.

COMPETITIONS.

INVERESK, NEAR EDINBURGH.—The plans submitted by Mr. J. Macintyre Henry, of Edinburgh, in a recent limited competition for altering and reseating the parish church of Inveresk have been adopted by the heritors and congregation. Including a new organ by Messrs. Lewis & Co., London, the cost of the work will be about 4,000*l.*

ROYAL ACADEMY LECTURES.—A course of six lectures is announced by Professor Aitchison on Architecture (the special subject not yet stated), to commence on January 29 of next year; the succeeding lectures of the course to be delivered on February 1, 5, 8, 12, and 15. The subject will be "The Advancement of Architecture."

Illustrations.

ST. MAGNUS' CATHEDRAL, KIRKWALL.*

MORE than one writer upon this Cathedral has given expression to a pretty general first impression of surprise at its richness and extent, considering the out-of-the-way situation Kirkwall occupies. On closer scrutiny this appearance of extent is found to be the effect of skilful proportions rather than of actual size; given length and height, width, it would seem, may be reduced to the minimum. The transepts internally appear almost majestic, and yet their width is but 17 ft., and that is typical of the general scale, the side western doors being only 2 ft. 7 in. wide.

What particularises St. Magnus is its colour treatment; most unfortunately the employment of a variety of stones has meant, in the case of the yellow sandstone, the introduction of a very perishable building material; this notwithstanding, Kirkwall is the best-preserved of all the Scottish Cathedrals, only Glasgow approaching it in that respect.

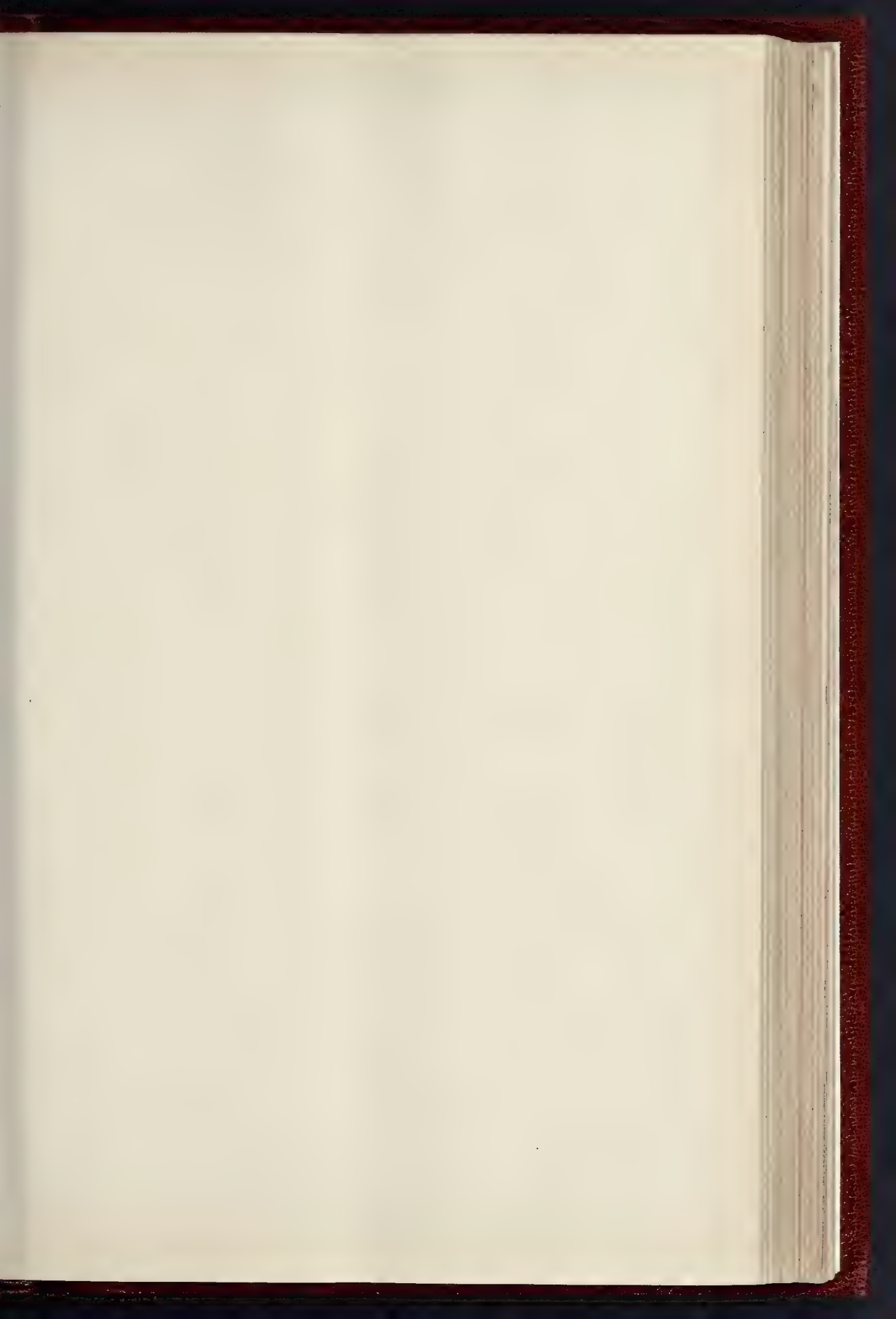
The patron saint was a Norwegian earl, Magnus, treacherously murdered in 1115 by a cousin who, with him, shared the government of Orkney. Of a gentle disposition in life, after death his virtues were magnified, and he was canonised in 1135. By that time the husband and son of a sister of the martyr, engaged in attempts to win back their usurped inheritance, vowed, if success were theirs, to erect a noble church to the memory of St. Magnus. They succeeded. The building was begun by 1137, and in three or four years had advanced far enough to be consecrated and receive the remains of the saint, till then deposited in the church of Birsay. There then existed several churches throughout the Orkneys: that of St. Ola, built a century earlier, was distant from the site of the new cathedral only a few hundred yards.

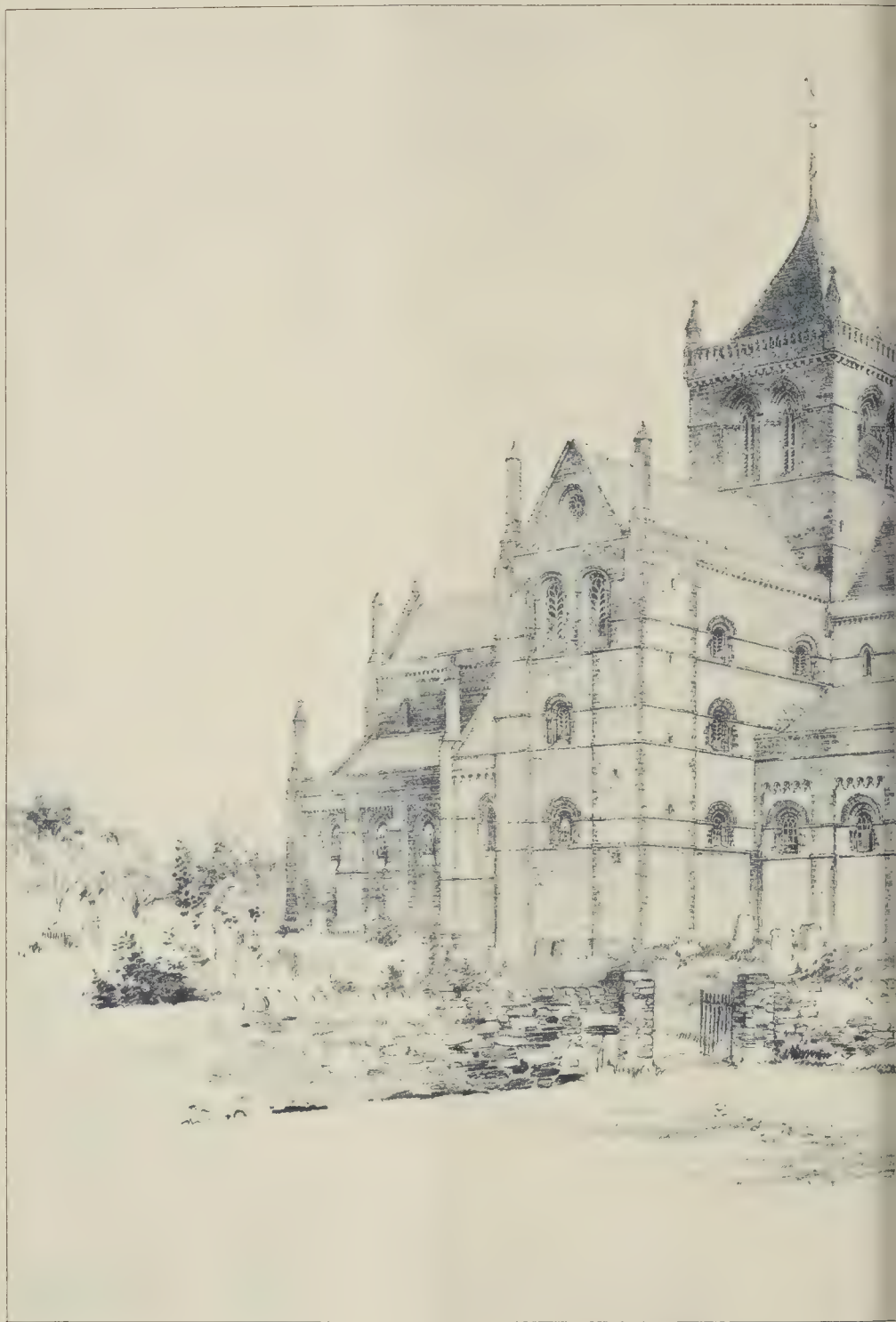
Carried from Iona, Christianity had obtained a footing in the northern islands by the seventh century, but during the period between 870-1000, that is until the time when King Ola formally professed the Christian faith, the north settlers were pagans.

Thereafter several churches are known to have been built; Birsay the chief, and see of the first bishop, William the Old (consecrated 1102); from that time the succession of prelates is clearly preserved. In 1154 Drontheim, in Norway, became the metropolitan see, and so continued to be until the cession of the islands to Scotland in 1468, when the ecclesiastical rule was transferred to St. Andrew's. Before that time the Norse earls, who held sway in Orkney, were practically independent princes, and for a time held possession as well of the northern counties of Scotland. Intermarriage with the Scottish nobility prepared the way for a change of allegiance. Orkney and Shetland had been pledged to Scotland as surety for the payment of the dowry of Margaret of Norway when she married King James III., it being stipulated that until redemption Norse laws and customs were to be preserved; but the dowry never was wholly paid, so the islands lapsed to the Scottish crown. It can hardly be said that the introduction of the feudal system was to the advantage of the Orcadians. The Orkneys were leased to a succession of Scottish earls, who were frequently most extortionate. One of them, Patrick Stuart, who built the Earl's Palace adjoining the Cathedral, made himself so obnoxious that, bishop and people uniting in resistance, he and a son were brought to trial, and executed at Edinburgh in 1614.

The Cathedral, as at first built, would seem to have consisted of a nave, transepts, and a choir, terminated with an apse; how the choir aisles ended is uncertain, they may have even met, circling round the apse. There was then no door in the south transept, but in the nave south aisles were two; the east one was built up subsequently (1250-1350), when it is supposed any intention of having cloisters or monastic buildings, if such was ever entertained, was finally abandoned. The three nave pillars, of the first period (1137-1160) that remain have octagonal capitals; the arches in the east walls of both transepts appear to have been formed at the very first, though closed up until the chapels were added. Quite possibly in the heart of the

* The series of illustrations of the Ancient Cathedrals of Scotland, which was begun in our issue of July 1, will be continued in the first number of each month, until December next. Particulars of this, and of the series of "Cathedrals of England and Wales," which ended in June last, will be found on page 272.



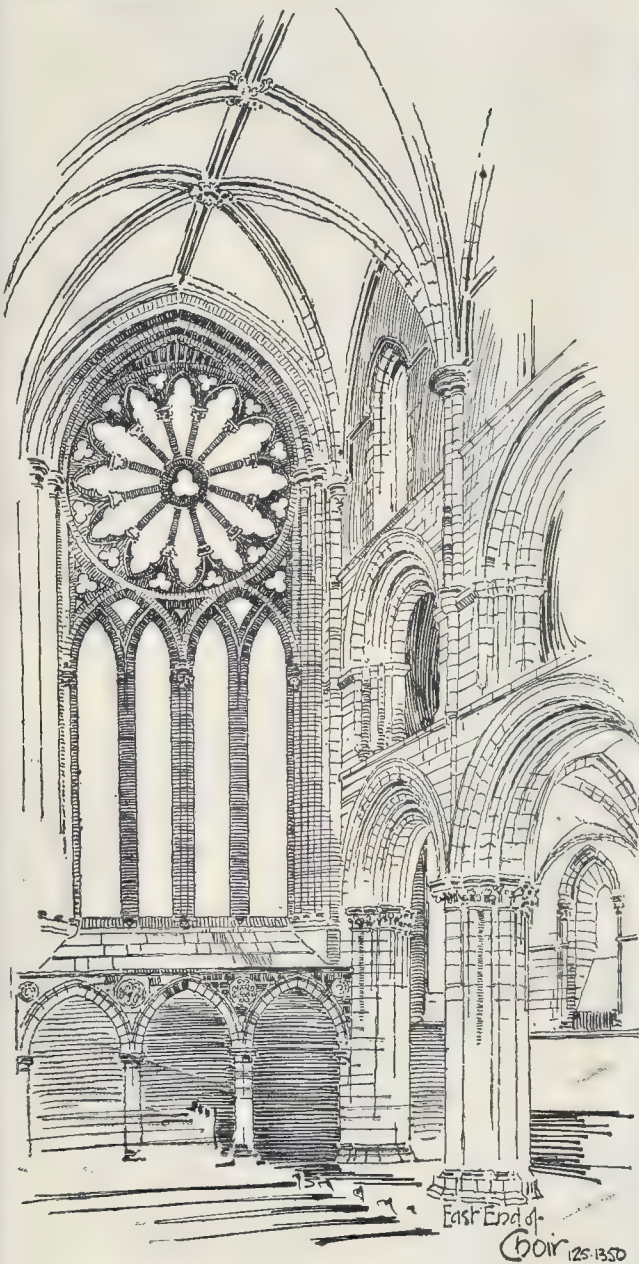


THE ANCIENT CATHEDRALS OF



NO. 1000 SPENCE & CO. 48, RATHMANSUR STREET, DUBLIN, IRELAND.

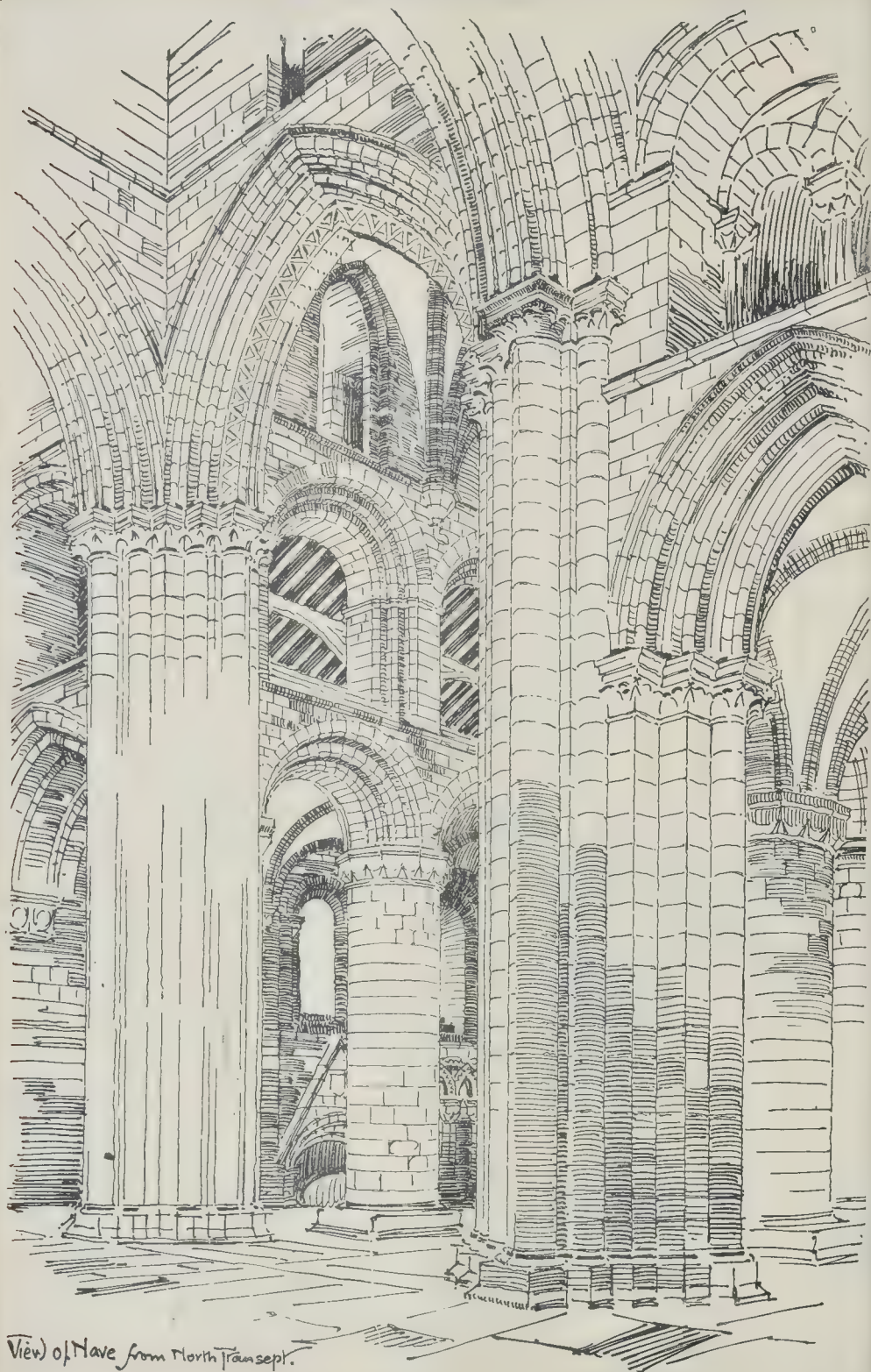
D.—DRAWN BY MR. ALEXANDER MCGIBBON.
KIRKWALL.



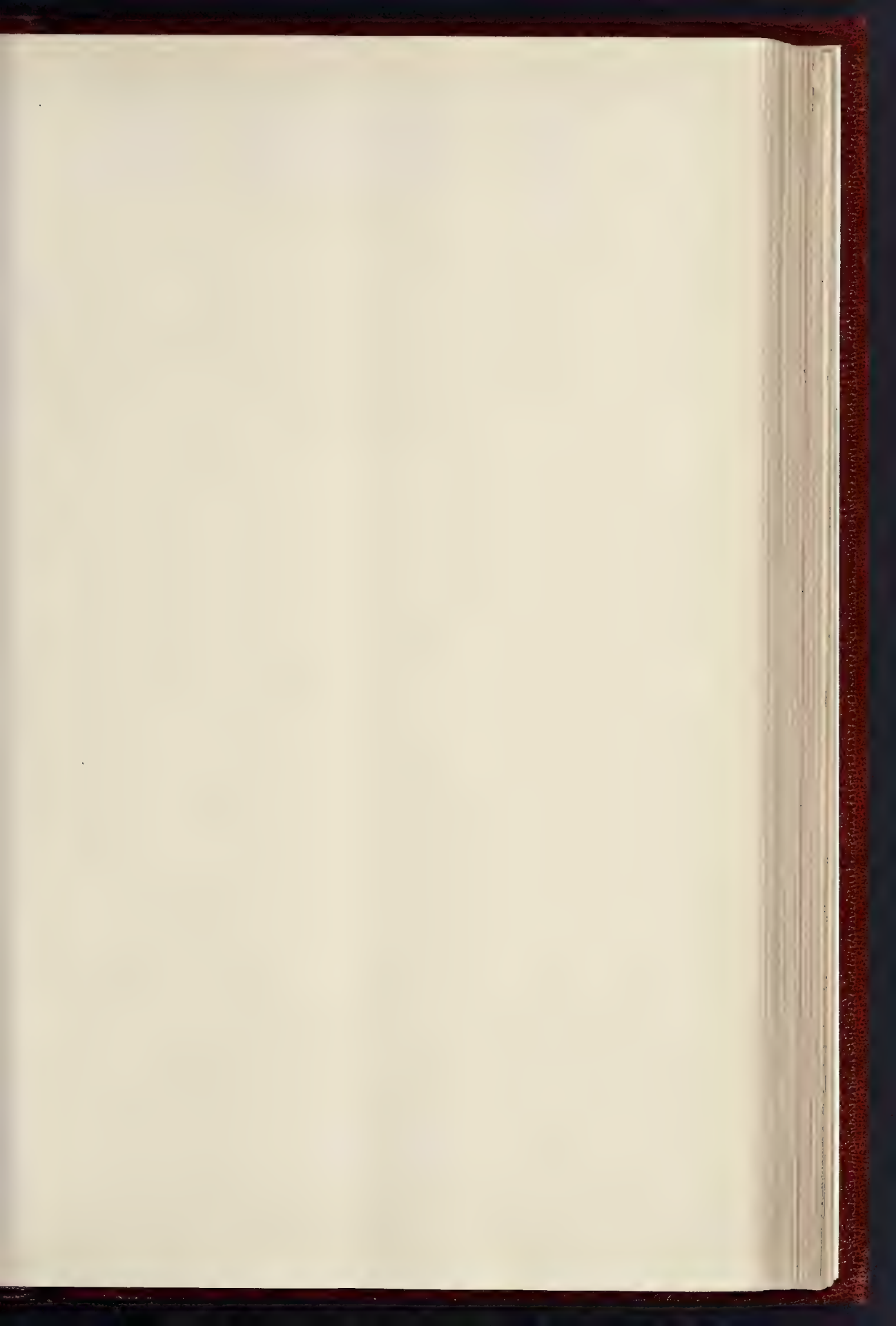
Transitional piers of crossing are the original Norman ones; equality in the span of the connecting arches was not apparently aimed at, as indeed throughout the church, to its latest period, irregularity in centring and in angles is very common. Both nave and choir middle aisles were at first covered with wooden roofs, the original height of the choir wall head is marked externally by the corbel course of masks, left in position when the walls were heightened two centuries later for the vaulting then added. The wall arcading under windows in the nave and transepts has three variations of design. The choir aisles were vaulted from the first; those of the nave were only so covered 1200-50, the east bay of the south aisle may be earlier than the others; it and the adjoining one show faint remains of

colour decoration in their ribs. At the triforium level there is an arch in both transept walls, partly visible externally, cut into by the aisle roofs of both choir and nave: it is one of the triforium arches returned in the transepts, with a double arch in its opening, and it is difficult to see how the obliteration could be avoided, unless the sloping aisle roof too had been returned and finished by a half gable rising from the aisle wall. The heavy work of this first period is of red sandstone, with rubble of a dark grey slate; the interior of the west wall of the transept shows the earliest use of alternate bands of coloured stones, a form of decoration employed in Kirkwall to a greater extent than perhaps in any other British cathedral. The piers of the crossing and the two chapels (1160-1200) were the first addi-

tion to the original design. The arches are pointed, sometimes enriched with a zigzag billet, and the capitals have volutes. The chapel floors extend into the aisle, under a barrel vault, covered with a sloping roof between the chapel and aisle wall, that is yet lower than the level of the church windows. This space on the south side was later formed into a chamber—a window was made its entrance—and there is rather a curious connexion with an apartment over the chapel, a shoot or vent carried up in the wall, and opening into that apartment a few feet above the floor. What its purpose has been it is hard to determine, but a sinister import is given by the discovery of a chained skeleton. During the first half of the thirteenth century, all but three of the nave piers were replaced—why is not apparent, as no calamity is recorded as having befallen the edifice; the bases of these new pillars are similar to those of the earlier ones, but the capitals are circular. The nave wholly, and the choir central aisle, were at this time vaulted; the centre rib of the choir is a later addition. In the nave vault—excepting the eastmost bay—there is an irregularity, a primitive kind of pendentive, that is interesting. The present roof is not the original one—that was of a steeper pitch, as may be seen from the tower walls, east and west. The national preference for the round arch form is seen in the nave north door and windows of this period. The next alteration was the greatest of all, the lengthening of both nave and choir, 1250-1350. In the choir the round form was continued in the aisle and triforium arches—less, however, from preference, we may believe, than from a desire to conform to the existing levels; the windows have pointed arches. Under the east window are three recessed arches, having enriched spandrels; this would seem to prove that the high altar must have stood in advance of the wall. The windows in the south aisle have at some subsequent time been altered; the south doorway in modern times was formed into a window. The door in the south transept is of this date; its alternate arch stones are of yellow sandstone that have decayed very badly, and are now temporarily made good with mortar rudely applied. The west gable has similar doors, the south with radiating, the others concentric bands of yellow stone; the buttresses too are banded. The pediment above the central door has been tampered with, and it is not quite clear what the original design has been. The upper part of the west window is held to be of later date than the lower; it certainly is of a form more quaint than beautiful, and rudely built; the skew of the gable, if ever properly finished, has been clumsily altered; the modern pinnacles, too, can hardly be accepted as reproductions of the originals. A possible cause of these blemishes is found in the assault the Cathedral underwent when the central tower was garrisoned by a son of the tyrannical Earl Patrick, who there, and in his palace, held out against the Crown for some time: shot-marks are yet to be seen on the Cathedral walls. It is quite likely that the damage then done was unskillfully repaired, the shield in the pediment is known to date about 1624. As to why the west front should be so much off a right-angle with the nave axis, and why connected to the nave by work nearly two centuries later (1450-1500), a reasonable explanation offered is that the original west front stood just about where the present westmost piers are; the new front was built outside, while the church was kept intact, and lack of funds probably delayed the demolition and extension. When the connexion was made, and the old front removed, the arches abutting against it were badly wrenched, and so appear to this day, while a bay of the central vaulting would appear to have collapsed in the operation. Two pillars take the place of the old gable; they are similar to the others, but have no square plinth. It is rather surprising that in this latest work, all grey-stone, the aisle windows should be so small; and that, though obviously intended to be vaulted, the new part never was: only in 1850 was the present plaster make believe added. The new roofing of both nave and choir necessitated by the extension appears to have been continued to the tower, and at a lower pitch than the former. For some reason not very apparent, Bishop Reid, the last of the pre-Reformation prelates, inserted the hexagonal headed door (p. 264) in the south wall of the nave (1540-58); there is a stoup at its entrance, and above are corbels that must have held the beams of some projecting porch between the buttresses. The Reformation movement in no way injured the fabric, beyond the disuse of the nave and transepts. The first mishap befell in 1671, when the steep



View of Nave from North Transept.



THE BUILDER, OCTOBER 7, 1893



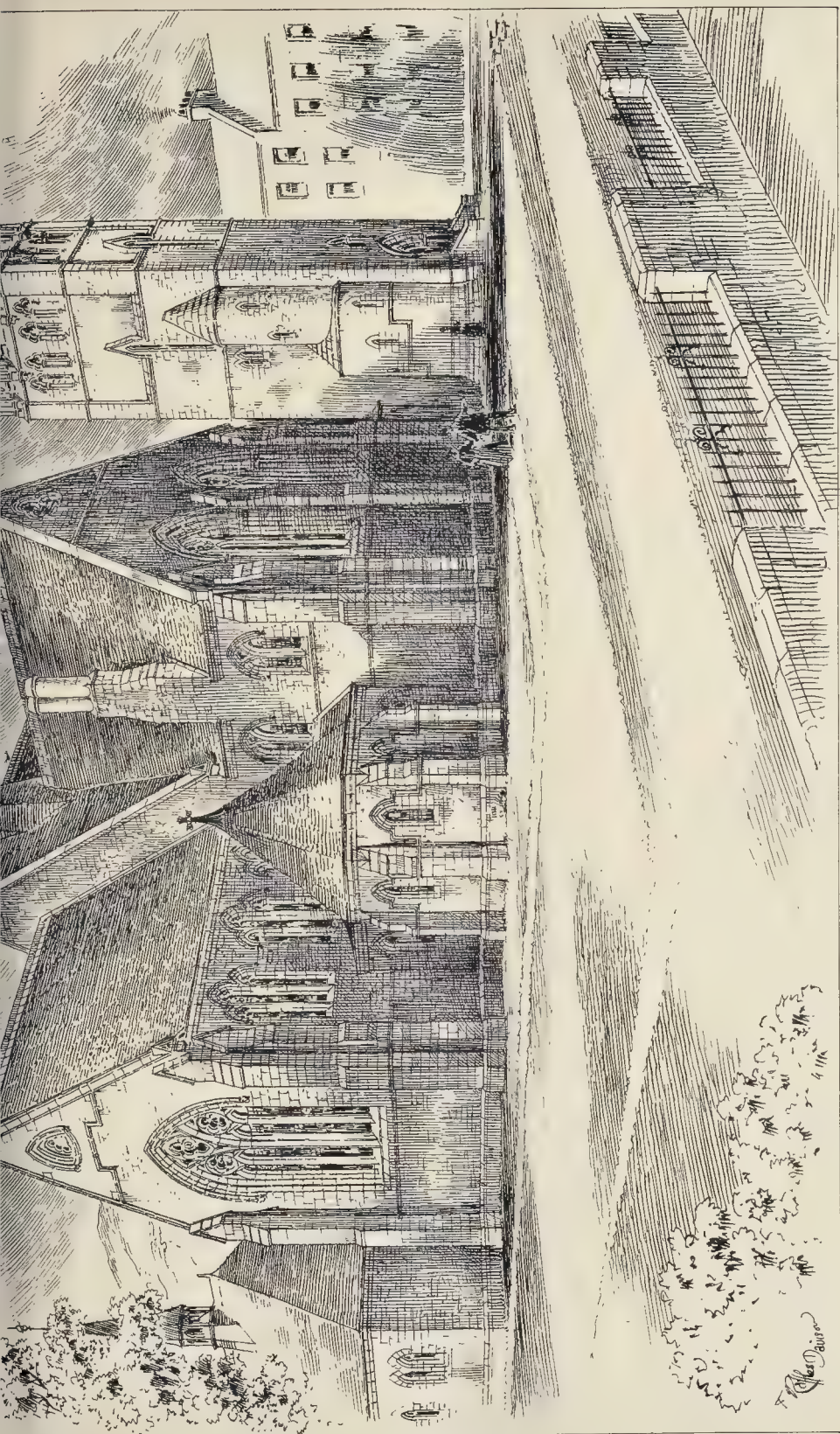
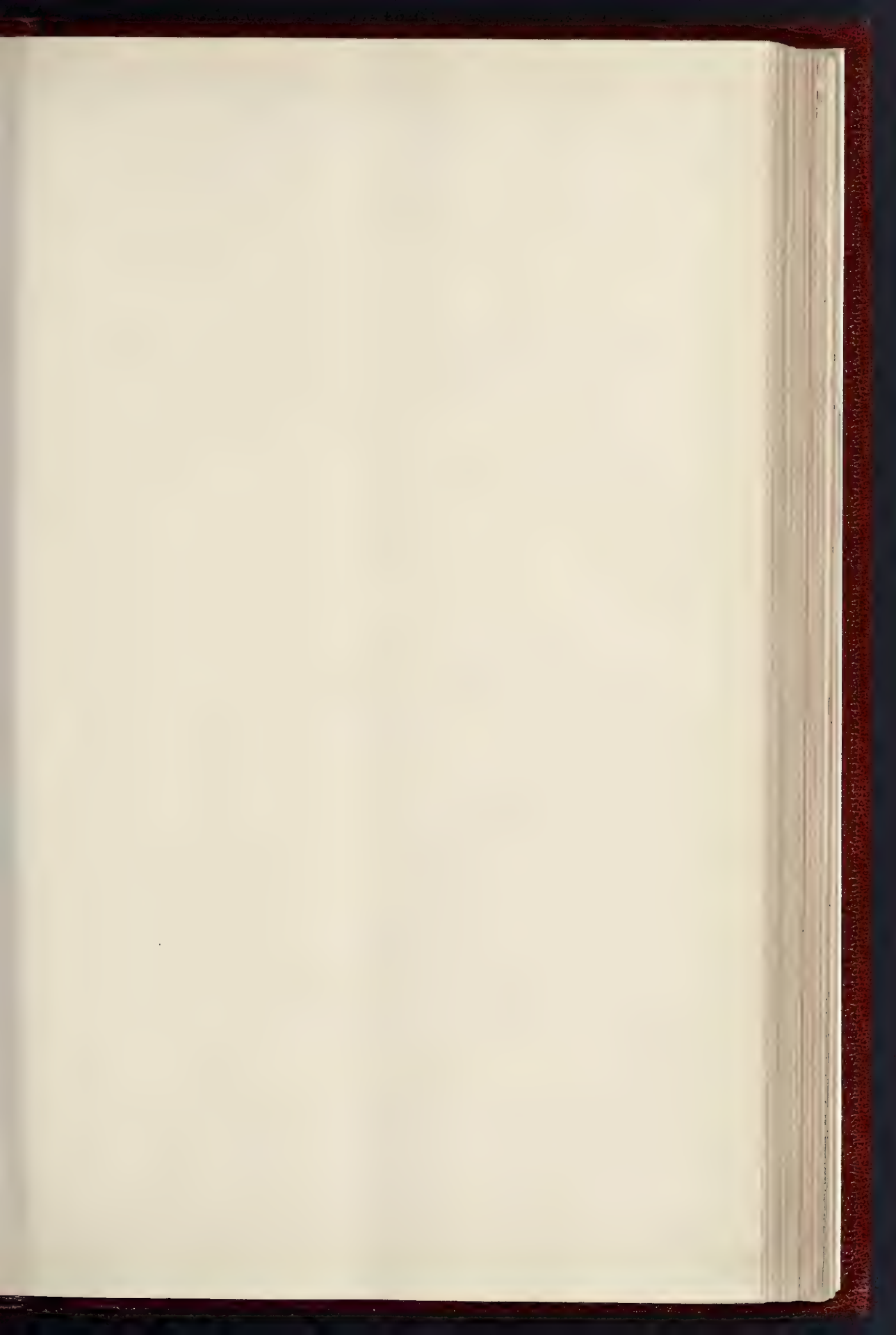


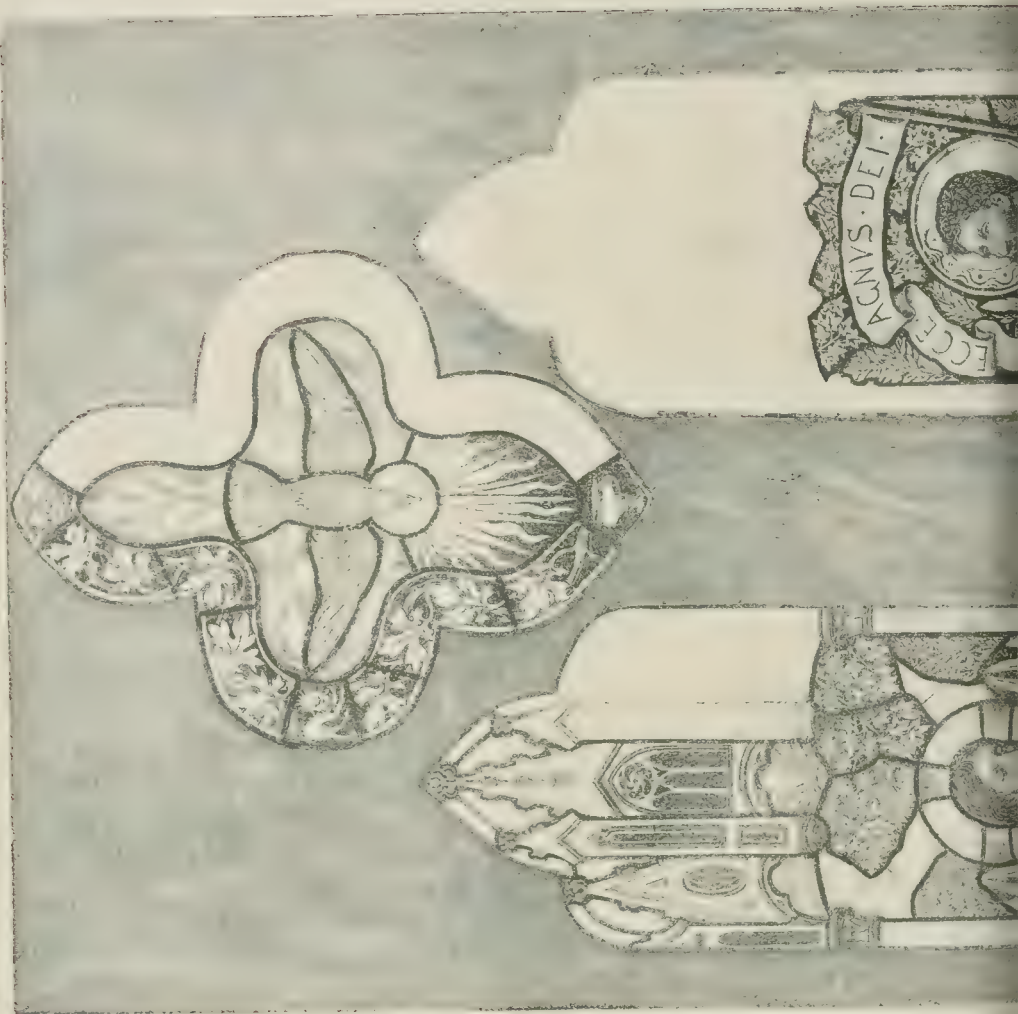
PHOTO. BY S. H. B. 1893. PAST HARDING STREET, PETER LANE, E.C.

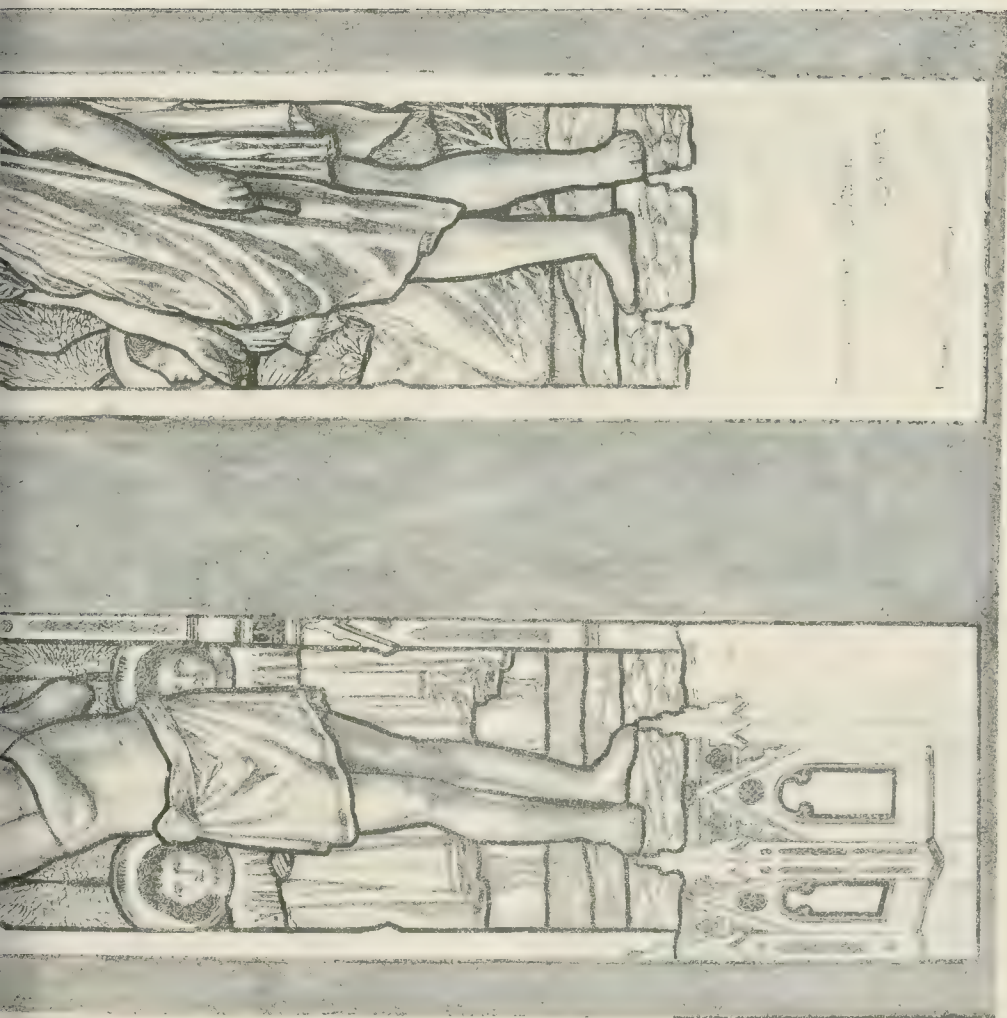
ST MATTHEW'S CHURCH, MORNINGSIDE EDINBURGH — MR HIPPOLYTE J BLANC ARCHT

Royal Academy Exhibition, 1893

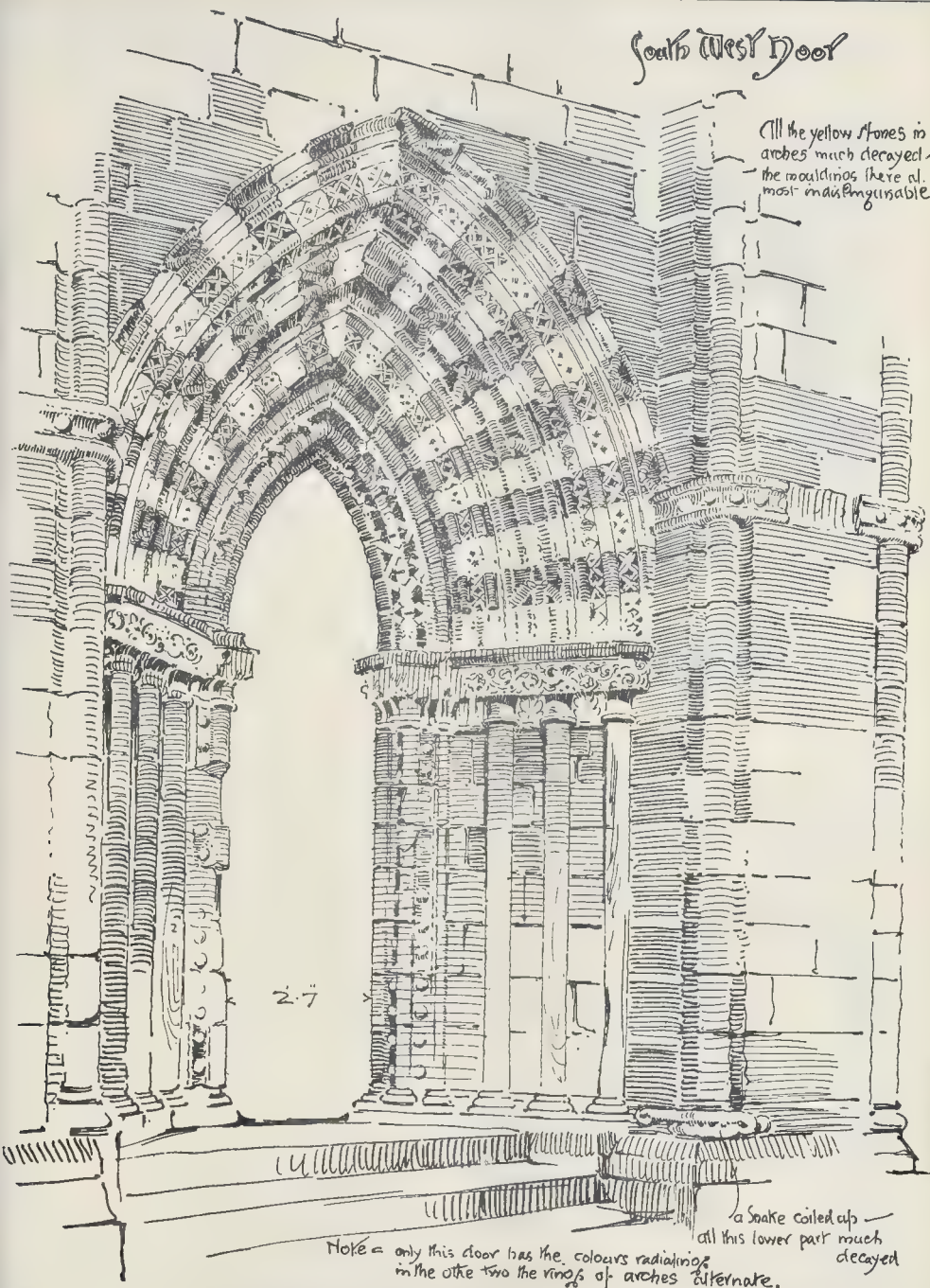


THE BUILDER. OCTOBER 7, 1893.





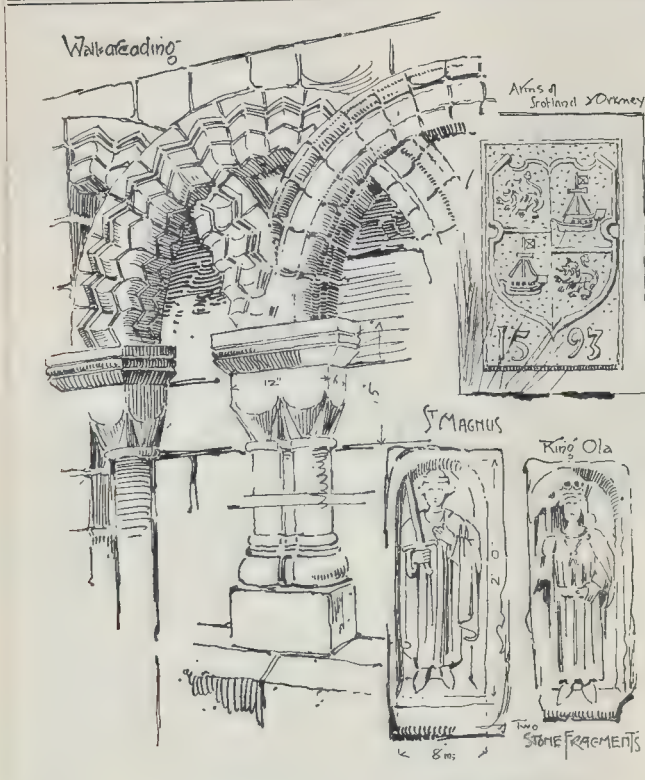
CARTOON FOR A WINDOW - BY MR. F. HAMILTON JACKSON



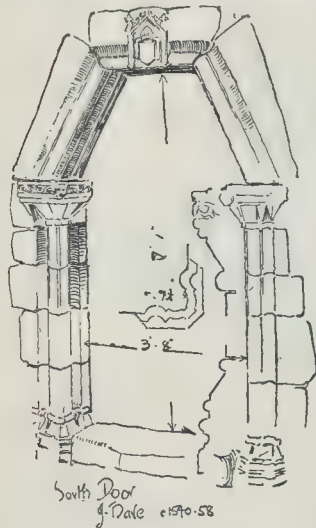
was fired by lightning and quite destroyed. What appearance this first steeple had it is hard to say. That which now takes its place is 123 ft. high; its corner pinnacles and the parapet are modern, and altogether this feature is the weak point in design of the whole Cathedral. It contains still four bells preserved from the fire; the roof covering, as elsewhere, is a rough grey slate that looks very well, of a thickness varying from $\frac{3}{4}$ in. to 1 $\frac{1}{4}$ in., and pointed with mortar in its vertical as well as horizontal joints; the hips and ridging are also of this stone. The present flagged floor

of the nave is on a slope, rising 12 in. from the west front to the entrance to choir; to the top of the altar steps is 4 ft. higher still, and to gain that height it is supposed that besides the three altar steps proper there may have been others at the junction of Norman and Early English work and at the entering from crossing. What is noteworthy is the importance given to the two staircases; their width is considerably more than the side doors of the west front or the one in the transept, and would lead to the supposition that they were intended to give access to apartments of some

importance, and not merely to the necessary passages at the various levels; the steps are not in one stone, and rest on a winding vault. There are two apartments at the triforium level over the chapels; that above the south one is of most importance, and is vaulted; it has the shoot or vent to the small cell or chamber already noticed, and is now used as a small store or museum for all the fragments of woodwork, carved stones, and tiles that have been found. There are preserved fragments only of the stallwork (Earl Patrick's pew), illustrated in Billings' view, but allowed



to be removed at the restoration. There are two small effigies of King Ola and St. Magnus, whose original situation is doubtful; most likely they were part of some tomb in the choir. The north transept was heightened 1200-1250; the beginning



of the former pitch is seen on the face of the tower, its staircase stops abruptly and is unfinished, but corbels left about the level of the clearstory seem to imply a floor; the transept would thus have a flat ceiling, above which was a commodious apartment. At one time there must have been many tombs in the choir, but these, through neglect and spoliation, have now disappeared. Chief of all

was the shrine of St. Magnus, but no description even of it exists. Next in importance was the tomb of Bishop Tulloch (1422-55), existing in part till 1845, but only fragments now remain. There was a wall-tomb in the north aisle to Lord Adam Stuart, son of James V., and one to a captain of the Spanish armada. In the nave the principal monument is the wall-tomb in the south aisle, dating about 1300, presumed to be that of the Earl of Strathorne, who became Earl of Orkney. Ranged along both aisle walls are many sculptured slabs of seventeenth and eighteenth century date. Since the Reformation only the choir has been used as a place of worship, with "lofts" or galleries (there was a double one at the west end), and, to give light under those in the aisles, square windows were broken through the walls (these are omitted in the view). The choir was screened off from the crossing then as now. In 1848 a renovation was begun by the Government, the congregation was dispossessed and their galleries removed, the upper part of the south transept was rebuilt, the vaulting wanting in nave made good with plaster, and, rather needlessly, the buttresses of the south aisle were added to, till they matched those alongside. What must chiefly be regretted in this work was the spoliation permitted of the tombs and woodwork. After a time when it became known that the edifice belonged to the town and not to the crown, a congregation was again permitted to occupy the choir: so now a gallery is re-introduced to the north aisle, and pewing throughout. The floor is all level with the top of the altar steps—these are covered—and thus the bases of the Norman work are hidden. The glazed partition between choir and crossing is rather obnoxious, and with the substantial walls that close up both chapels ought to be removed. The mutilation of the north chapel by the introduction of the vestry floor is quite gratuitous, and should be remedied. Some of the windows have recently been restored in a very credible manner, so it may be hoped that these other improvements will not long be delayed. South of the west door is a mutilated church cross, dated 1621; it is supposed to be a reproduction of an earlier one. Most information about St. Magnus is to be had from the excellent monograph prepared by Sir Henry E. L. Dryden, published in the "Transactions of the Architectural Institution of Scotland,"

1869-71, with coloured plates; also his smaller "Description of the Church of St. Magnus and the Bishop's Palace, 1878"; Worsaae's "Account of Dances and Norsemen in England," 1852; and Billings' "Baronial and Ecclesiastical Antiquities," 1848.

ST. MATTHEW'S CHURCH, MORNINGSIDE, EDINBURGH.

THE illustration of this church, designed by Mr. Hippolyte J. Blanc, is from a drawing which was hung in the Architectural Room at the last Royal Academy Exhibition.

The plan of the building is subjoined. The piers are so arranged as not to obstruct the view of the pulpit from any of the congregation. Special provision is made for the extraction of vitiated air through an interior trunk to a main outlet, which terminates in a flèche in the roof, and for the control of the entrance of fresh air.

The architectural style and treatment of the exterior are sufficiently shown in the illustration. The masonry is of red Dumfriesshire stone. The church is to seat about 1,000 persons.

CARTOON FOR WINDOW, SEPTON.

SOME little time ago the tower of St. Helen's, Septon, was restored internally (as an inscription records) by Mary Birchall and Richard Rainshaw Rothwell, in memory of Sarah Rothwell, under the direction of the Rector, the Rev. G. W. Wall. A gallery was removed, the walls cleared of whitewash so carefully as to preserve the mason's marks, the bell-chamber refloored, a coat of paint removed from the font (which had been marbled to conceal its real material!), &c., and at the same time this window was inserted.

The angel's wings are ruby, and so is the ground of the quatrefoil, and the filling of the little openings in the base. St. John's dress is old gold colour and orange brown; the Christ's nimbus and loin-cloth, and St. John's banner, are agate sort of glass; the angels' dresses, pale opal ruby on blue and greyish greens; St. John's nimbus and background of the other, light blue; the rest of the glass white and stain, except the trees.

The window was designed by Mr. F. Hamilton Jackson, and the illustration reproduced from his cartoon.

THE LONDON COUNTY COUNCIL.

THE first meeting of this Council after the summer vacation was held on Tuesday afternoon last at Spring-gardens, the chairman, Mr. John Hutton presiding.

Tenders.—The following tenders were opened by the Chairman:—

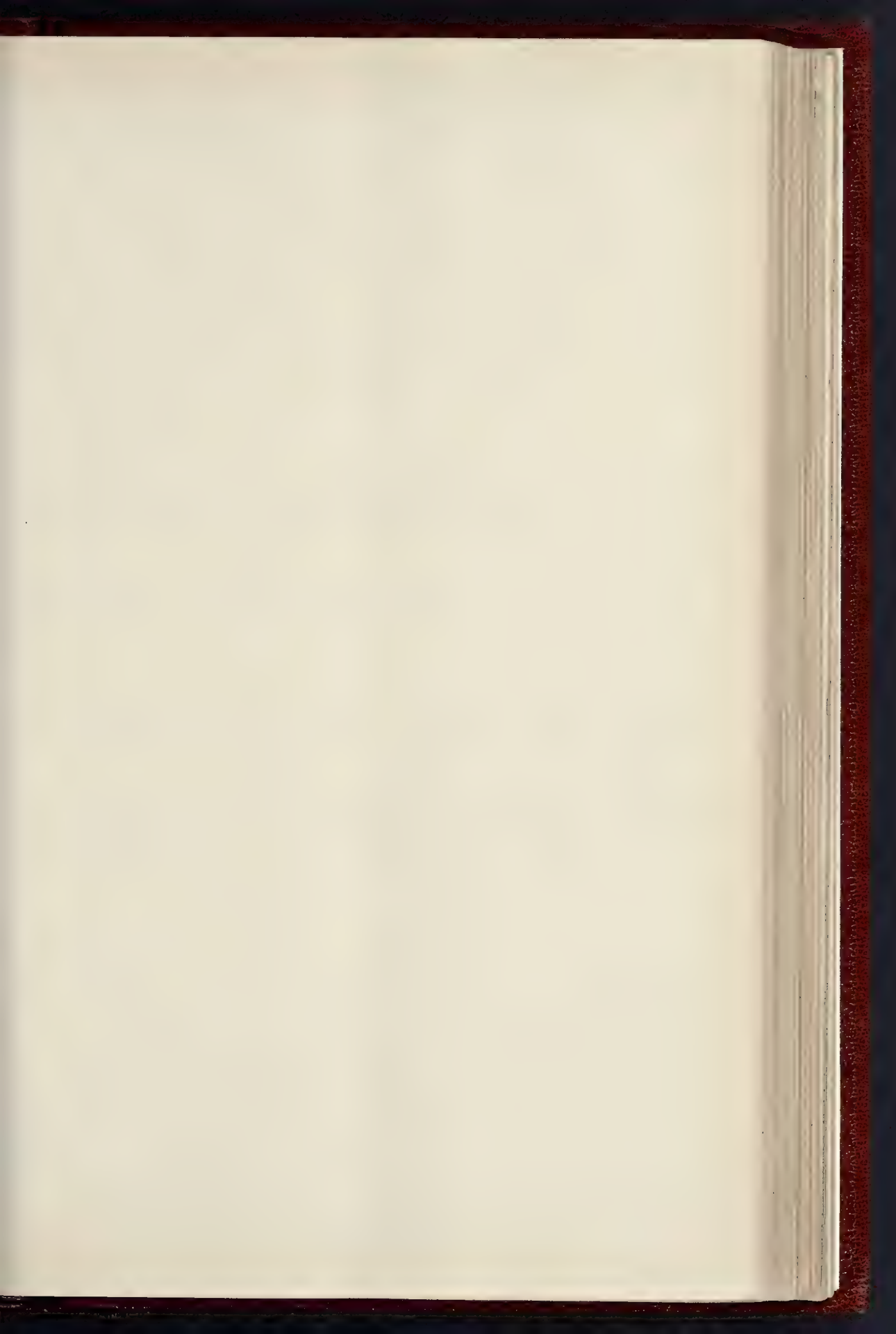
For the reconstruction of four bridges at the Isle of Dogs:—

Andrew Handyside & Co., Ltd.	63,863	3	d.
Woodhouse & Rawson, Ltd.	62,001	0	d.
Sir W. Arrol & Co., Ltd.	58,158	9	d.
Phoenix Foundry Co.	57,955	9	d.
Alfred Thorne	57,541	0	d.
Thames Iron Works and Shipbuilding Co.	55,021	11	d.

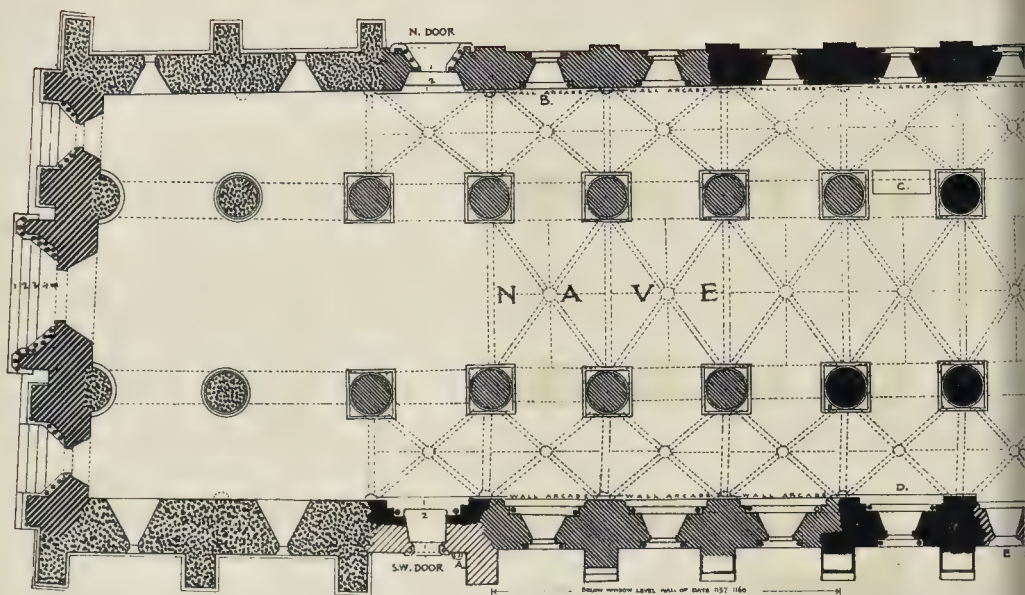
For the supply and erection of three steel tanks at the Barking Outfall Precipitation Works:—

Jesse Fildesley	16,284	2	d.
W. C. Holmes & Co.	13,704	0	d.
Whessoe Foundry Co., Ltd.	13,296	15	d.
John Fraser & Son	12,455	14	d.
Goddard, Massey, & Warner	12,095	8	d.
W. R. Renshaw & Co.	12,010	16	d.
Thames Ironworks, &c., Co.	11,094	5	d.
Braithwaite & Kirk	11,318	13	d.
Sir W. Arrol & Co., Ltd.	11,028	7	d.
Heenan & Froude	10,797	0	d.
Clayton, Son, & Co.	10,330	14	d.
Tees Side Iron and Engine Works Co., Ltd.	9,424	3	d.
John Lysaght	9,169	7	d.

Finance.—The Finance Committee, in their report, stated that they had considered the estimate of the receipts and expenses of the Council for the year ending March 31, 1894, with reference to the amount required to be raised in the second six months of the year by means of contributions, with the view of ascertaining whether revision was necessary. As it did not appear that "the amount of contribution or rate estimated at the commencement of the year would be larger than was necessary or would be sufficient," they did not recommend the Council to revise the estimate and alter the rate. The rate therefore remains at 6½d. in the £, as estimated by the Council in April last.



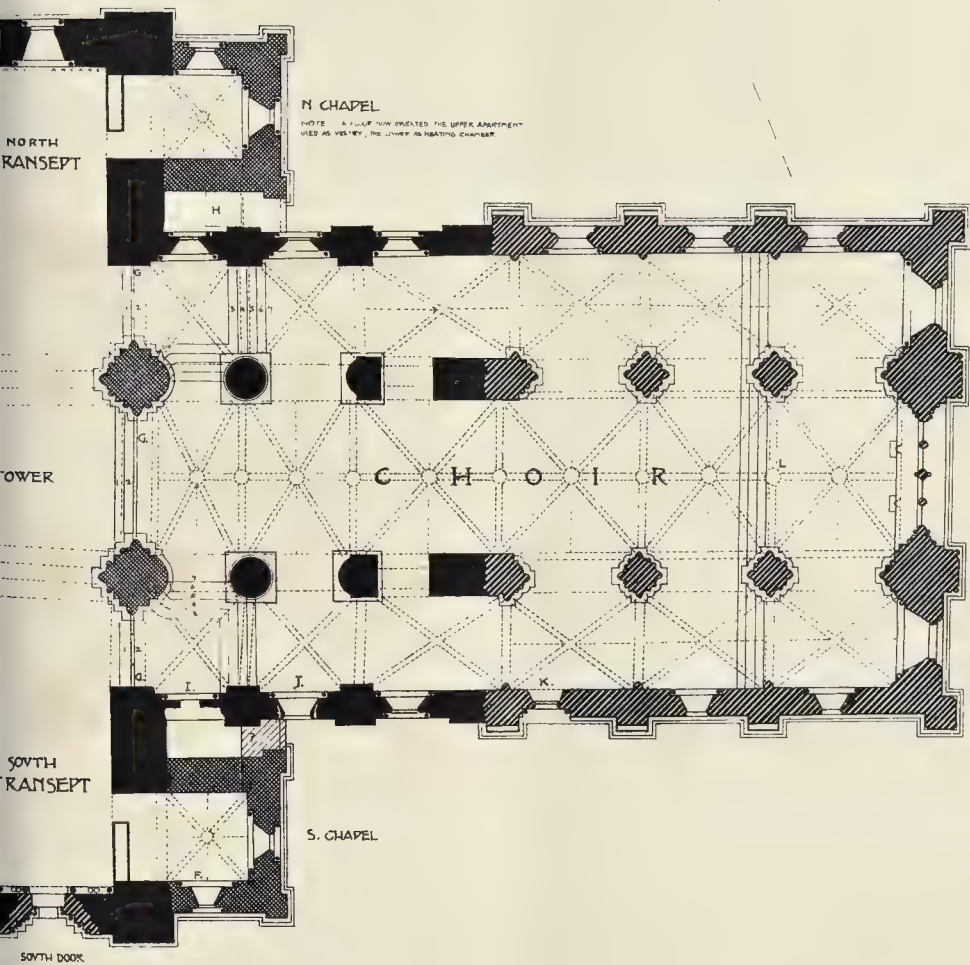
ST MAGNVS' CATHEDRAL: KIRKWAIL: ORKNEY.



DATES	
1137 - 1160	
1160 - 1200	
1200 - 1250	
1250 - 1350	
1450 - 1500	
1540 - 1558	
1850	

- A. Water Group
- B. This bay of Arcade only of Third period
- C. Crucifix to Dr Balfour
- D. Wall Tomb under c. 1500
- E. Original door built up
- F. Aumbry & Piscina and/or window
- G. Modern wood partition
- H. Built chimney stack here
- I. Window originally transformed into door to chamber
- J. Window altered when wall built between chapel and Aisle
- K. Door, made window in 1850
- L. Above steps now corrected

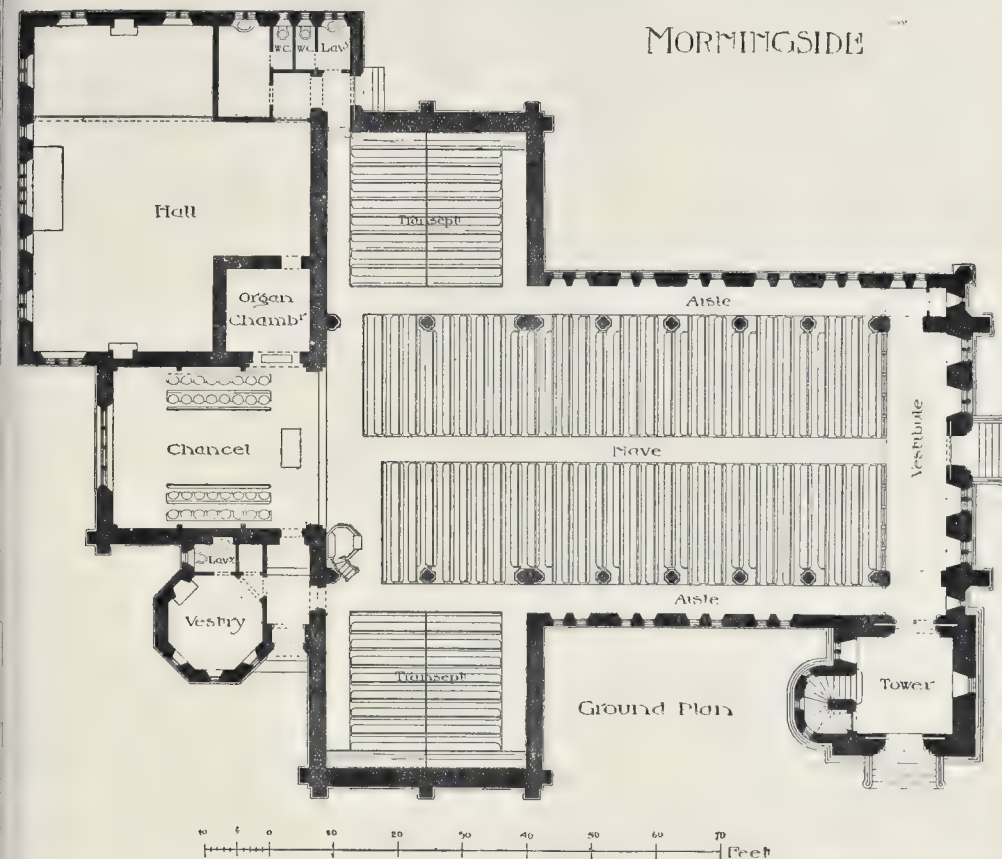




Based on Plans by Sir Henry EL Digges
measured in 1844-55 and published in 71.
Windows now vaulting now shown
After M. Gibbons

ST MATTHEW'S CHURCH

MORNINGSIDE



Loans.—On the recommendation of the Finance Committee the following loans were granted:—8,000*l.* to the Vestry of St. Pancras for the purchase of land to be utilised for electric lighting purposes; 11,171*l.* to the Vestry of St. Martin-in-the-Fields for paving works; 5,100*l.* to the Vestry of Kensington for wood paving works; 4,500*l.* to the Guardians of St. Pancras for the erection of an isolation block at their schools at Leavesden; and 14,000*l.* to the Guardians of Lewisham Union towards the cost of erecting an infirmary.

Proposed Tramways over Westminster Bridge.—The Highways' Committee presented the following report and recommendation:—

"We have considered the resolution passed by the Council on June 27 last, on the motion of Lieut.-Col. Ford, referring it to us to consider and report on the expediency of action being taken to secure the construction of a tramway across Westminster Bridge, and on to and along the Victoria Embankment up to the approaches to Charing Cross; and in connexion with this matter have had the advantage of an interview with Col. Ford.

On October 18 last we reported to the Council on this subject, and recommended that as the London Tramways Company declined, owing to the opposition offered to the proposal for the tramway, to resume negotiations for a lease of the tramway if made, the Council should not re-introduce the Bill which was rejected by Parliament last session. This recommendation was adopted by the Council. We would point out that a very large portion of the London Tramways Company's system will become purchasable by the Council in 1898; and we are of opinion that, although there is a public demand for the tramway, it would be better to defer any further application for power to construct it, until nearer the time for the purchase by the Council of the undertaking with which the new tramway would be in close connexion. We recommend:—

"That no action be taken by the Council at present to obtain powers for the construction of a tramway over

Westminster Bridge and along a portion of the Victoria Embankment."

Lieut.-Col. Ford moved as an amendment that the recommendation be referred back to the Committee for further consideration.

Mr. Torr seconded the amendment.

Mr. Westacott contended that the Committee had done all they could to get an amicable arrangement with the tramway companies, and as they had failed in their attempt there was no use proceeding further with the matter in the meantime.

The amendment was lost, and the recommendation of the Committee carried.

Higgate Archway.—The following report and recommendation of the Highways Committee were presented:—

"On July 11 last the Council decided to apply for Parliamentary powers for widening Archway-road and, in connexion therewith, the widening of the Higgate Archway, the cost of the work, estimated at 27,000*l.*, to be borne (with the exception of 1,000*l.* which the Ecclesiastical Commissioners have agreed to contribute) in equal proportions by the Council, the Middlesex County Council, the Vestry of Islington, and the Hornsey Local Board. We at that time reported that the Hornsey Local Board had suggested that the archway when reconstructed should be afterwards maintained by the two County Councils as a county bridge, and we have now to state that the Middlesex Council has attached to its consent to contribute a condition that this arrangement shall be made. There appears to be at present no statutory provision for the repair and maintenance of the structure, and we are of opinion that the proposed arrangement may be accepted by the Council. We therefore recommend:—

"That the Parliamentary Committee be instructed, in preparing clauses to authorise the reconstruction of Higgate Archway, to insert a provision that after such reconstruction the archway shall be repaired and maintained at the cost of the County Councils of London and Middlesex in equal shares."

The recommendation was agreed to.

Drainage.—The Main Drainage Committee reported as follows:—

"In accordance with the resolutions of the Council on June 20 and August 1 last, a series of observations on the chemical character of the water flowing down the river Thames has been made since July 3. These, taken as they have been in a period of abnormal dryness, will prove exceedingly valuable, and the engineer and chemist are of opinion that the analyses should be continued until the river again begins to rise as the cold weather approaches. They suggest that as the whole question of the purity of the lower reaches of the river may become a subject of great importance, this opportunity should not be missed, and that the examination should continue for a further period of nine weeks at a cost of 177*l.*, or 13*l.* per week. We concur in this view, and recommend:—

"That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, the Council do sanction a further expenditure of 177*l.* for the purpose of the examination of the water of the river Thames."

We have from time to time received numerous complaints of the offensive condition of Hammersmith Creek, and strong representations have been made to us on the subject by a deputation from the Vestry of Hammersmith. Its present bad condition, we find, due to the creek being used as an overflow in time of rainstorms for the Stamford Brook sewer, and most of the sewage which enters it on those occasions ultimately finds its way to the Thames, a portion of the overflow being conveyed by an 18-in. pipe along the creek into the low level sewer. The engineer now suggests that, in addition to the existing pipe sewer, the 4 ft. 3 in. by 2 ft. 8 in. branch sewer at the lower part of the creek, which is connected with the northern low level sewer, should be extended to the junction of the creek with the Stamford Brook sewer, and he estimates the cost of the work at 1,850*l.* We concur in the opinion of the engineer, and consider it very advisable that this work should be carried out, as by this means the discharge of sewage into the Thames from the creek will be avoided, except perhaps during an excep-

tionally heavy rainstorm, and bad smells from deposits of sewage matter in the creek avoided. The work being such as can be carried out by the Works department, we recommend—

"That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, the work above referred to be executed by the Council without the intervention of a contractor, and that the plan, specification, and estimate be referred to the Works Committee for that purpose."

The recommendations were agreed to.

Palace Theatre.—The Theatres and Music Halls Committee stated in their report that they had received a letter from Mr. W. Emden, dated September 20, 1893, forwarding five plans showing certain alterations which the directors desired to make to the Palace Theatre of Varieties, Shaftesbury Avenue, and asking for an interview with the Committee on the subject. In pursuance of this request, Mr. Charles Morton, manager, Mr. Beyfus, solicitor, and Mr. Emden's representative had conferred with them on the subject. The Committee had carefully considered the proposals, and were of opinion that the removal of the open boxes on the grand circle tier would not be objectionable, provided the space thus obtained were at once filled with seats. The position of the proposed bar in the exit vestibule was also objectionable from a structural point of view, as its use would probably impede the exit of the public.

The recommendation of the Committee that the plans be not approved was adopted.

The Water Supply of the Metropolis.—The following report was received from the Water Committee:—

"The Royal Commission appointed on March 15, 1892, to inquire into the water supply of the Metropolis has made its report, which was presented to Parliament on the 14th instant. We have received copies of the report and have met to consider it, but it is of great length, and the importance of the subject generally demands greater attention than we have yet had the opportunity of giving to it. We are not, therefore, in a position to make a report to the Council on the subject, and can only at the present time submit the effect of the conclusions at which the Commission has arrived on the questions of quantity and quality, to which their reference was limited. This we cannot do better than by giving the exact words of the Commissioners as stated in paragraph 178 of the report. They are as follow:—

"We are strongly of opinion that the water, as supplied to the consumer in London is of a very high standard of excellence and of purity, and that it is suitable in quality for all household purposes. We are well aware that a certain prejudice exists against the use of drinking water derived from the Thames and the Lea, because these rivers are liable to pollution, however perfect the subsequent purification either by natural or artificial means may be; but having regard to the experience of London during the last thirty years, and to the evidence given to us on the subject, we do not believe that any danger exists of the spread of disease by the use of this water, provided that there is adequate storage, and that the water is efficiently filtered before delivery to the consumers."

We have directed a copy of the report to be forwarded to each member of the Council, and we hope at no distant date to be able to present a full report on the conclusions of the Commissioners."

Works.—The Works Committee reported that they were satisfied with the estimates and specifications submitted by the undermentioned committees, and were taking the necessary steps to carry out the following works:—

Asylums Committee.—Farm buildings, mortuary, and cottages at Claybury Asylum	14,200
Bridges Committee.—Putney Bridge—Roughing carriageway	350
Establishment Committee.—Central office—Formation of lavatory	75
Fire Brigade Committee.—Kentish Town fire-station—re-paving	54
Highways Committee.—Re-metalling Victoria Embankment carriageway	3,100
Main Drainage Committee.—Northern outfall—Repairs to fencing	85

Mr. Lyon stated that the re-metalling of Victoria Embankment would be carried out during the winter, when there would be more men out of work.

On the recommendation of the Works Committee, it was decided to appoint a second assistant in the building branch of the Works department, at a salary of 200*l.* per annum.

Locomotion.—Mr. W. Saunders, M.P., moved, and Mr. Beachcroft seconded, the following resolution:—

"That the Public Health and Housing Committee be requested to consider and report on the desirableness of offering premiums for the best essays on locomotion in London, including railways, tramways, omnibuses, and steamboats."

Mr. Westcott moved the deletion of the words "on the desirableness of offering premiums for the best essays on," and the substitution of the words "on the best means of obtaining information on the question of."

Lieut.-Col. Ford seconded the amendment, which, after some discussion, was carried.

Correspondence.

To the Editor of THE BUILDER.

THE MANKS CROSSES.

SIR,—A communication appears in your issue of September 30, by Mr. Archibald Knox, on the Ancient Crosses in the Isle of Man, many statements contained in which are very misleading, and cannot be allowed to pass unchallenged. To begin with the author says, "These ancient crosses (presumably the whole of those illustrated) are apparently the work of one maker of the name of Gaut." Now, although the inscription on one of the crosses at Kirk Michael affords a certain amount of ground for this belief, the art characteristics of the monuments prove conclusively that such a theory is quite untenable. Amongst the crosses in the Isle of Man are three distinct types, each of which is the product of a different archaeological age, namely (1) the upright cross slab, related to those of Scotland; (2) the wheel cross, related to those of Wales; and (3) the free-standing cross, related to those of Ireland. The ornament also shows the same intermixture of Celtic and Scandinavian elements that is to be found amongst the Manksmen themselves, and in the personal and place names of the island and its inhabitants. Some of the crosses are much more Celtic than the others, and the quality both of the art and the execution of the designs varies greatly in different specimens, showing that they are neither the product of one brain nor the workmanship of one man. Mr. Knox does not seem to be aware that a large proportion of the figure subjects on the crosses have been already explained (see Mr. P. M. C. Kermode's "Catalogue of the Manks crosses"). The "man stabbing a serpent with a sword," he refers to as being of frequent occurrence, is Sigurd killing the dragon Fafur from the Sigurd Fafur's-bane legend. Mr. Knox's illustrations are beautifully drawn, but much of the character of the originals is lost in consequence of the bands of the plaitwork being in all cases made too straight and regular. As far as my experience goes, absolutely true circles and straight lines are practically unknown in the designs on the crosses, being naturally distasteful to the eye of an artist.

An absurd mistake is made in fig. 12 (Malumkun's Cross, Kirk Michael), where the T-headed key for tuning the strings of the harp has been taken for the lower part of an animal.

I. ROMILLY ALLIN.

Of course Mr. Knox's drawings and article were given entirely on his own responsibility. His theory that all the crosses were made by Gaut appeared to us at first sight most improbable.—ED.

SIR,—The interesting series of drawings contrabasted by your issue of September 30 together with his remarks as follows—"But what is absent from the crosses is as much a matter for wonderment as what is on them. More still a matter for wonder is the fact of the existence of the crosses," suggest the importance, now that the once-prevailing idea that the cross was exclusively a Christian symbol has been abandoned, of distinguishing between the Christian and pre-Christian use and significance of that emblem.

The leading lines determining the forms of these crosses of the Isle of Man are those of the *crux immissa* of equal arms, developed in some cases to represent the *crux immissa* of unequal arms, and connected, in both cases, with the circle or nimbus representing the disk of the sun.

The chief surface ornament is sinuous and interlacing, in some instances having a scale-like appearance, and in others more clearly showing its origin and development from the serpent form. As a matter of fact, the *crux immissa* is found to have been used in many countries as a religious emblem for centuries prior to the Christian era, and, as the mystic Tau of the Chaldeans and Egyptians, the original shape of the *crux immissa*, or letter T, was revered, being the initial of one of the forms of the name, Tammuz, of the Pagan saviour. To identify him with the sun this cross or letter was sometimes joined to a circle, and the connexion between the sun and the serpent is given by Owen, who states that "in the mythology of the Primitive world, the serpent is universally the symbol of the sun," the life-restoring *Asclepius*, who is also styled the man-instructing serpent.

Although Satan is generally connected with the form of a serpent, it is remarkable that the Yezidism, or avowed Devil-worshippers of the present day, look upon the peacock as his emblem, stating that it was in that form that the fallen angel tempted Eve.

At any rate, these combinations of cross and

nimbus with serpentine ornament in the Isle of Man may probably be regarded, although set up in the Christian era, as illustrating that which is pre-Christian.

Crosses as Christian memorials are continually being erected from old models in our churchyards and cemeteries, apparently upon the supposition that every cross-form must be of Christian significance; but as that is by no means necessarily the case, it seems desirable that, in following the lines of any such ancient monuments, at any rate those of Pagan, or doubtful, meaning should be avoided.

J. HOUGHTON SPENCER.

TARRING OUTSIDE WOODWORK.

SIR,—Wishing to tar the external woodwork, including verandah and porch, of a half-timbered house in the south of Scotland, I have made inquiries in several quarters, professional and practical, and have received much information all of the most contradictory nature. I should be very much obliged if some of your readers in the south, to whom such a process must be a matter of daily specification or application, would supply me with reliable information, particularly as to the following points:—(1) Is *Archangel* tar the best material to employ? And will it produce the very dark-brown or black colour characteristic of tarred work? (2) Should the tar be thinned, and if so, with paraffin or boiled linseed oil (hot) or both, and in what proportion?

It is desired, of course, to have a material which will be a good preservative of timber, and which should not require to be removed except after a period of years. In this connexion, how many coats should be applied?

ARCHITECT.

SQUEEZES FROM BELL INSCRIPTIONS.

SIR,—I should be much obliged if you or some of your readers would kindly inform me if any, and what, composition is obtainable, and where, for taking copies or squeezes of bell inscriptions, and how to use it; a composition which would harden, and so could be safely carried away for casting from, on return from a journey. I should be greatly obliged for information, or a hint as to how or where to obtain it.

W. SCORER.

ICE-HOUSE.

SIR,—Would any of your kind readers give me particulars for an ice-house, about 6 ft. square, or any other convenient size and depth, with probable cost.

A CONSTANT READER.

The Student's Column.

GEOLOGY.—XV

STRUCTURAL DEFINITIONS (CONCLUDED).

OVERLAP.—When sediment is deposited off shore in a subsiding area, it successively transgresses, or extends beyond the limits of the older beds of the same formation; the later portions of the deposit are laid down progressively on the rocks as the land sinks. This phenomenon

FIG. 1.



Fig. 1.—Section of Overlap in the Lower Jurassic Beds of the South-west of England.

a. Upper Paleozoic Rocks. b. Liasic Rocks, with conglomerate at base, resting unconformably on a and overlapped by the Interior Outlier, c, which runs across them and on to a. The extension of the beds, d, has been arrested by denudation.

is called "overlap" and is illustrated in fig. 1, which is reproduced from a section by the late Sir Henry de la Beche.

Outlier.—Where a small isolated patch of rock has been detached (usually by denudation) from its parent mass, as is illustrated in fig. 2.

FIG. 2.



Fig. 2.—Section across a Tract of Country showing an Outlier (a) detached by denudation from its parent mass (b).

Anticline and Syncline.—Earth movements have frequently caused stratified rocks to assume an undulatory character over a large area, like a succession of waves. The crests of such waves would exhibit what is known as an anticline

structure, and the troughs synclinal structure, as shown in fig. 3; they are familiarly called anticlines and synclines.

FIG. 3.



Fig. 3.—Section across a Tract of Country showing (a) anticline and (b) synclines.

In this figure it will be noticed that the synclines form the hills, and the anticline the valley between them, which seems at first sight rather paradoxical; but this is very often the case in Nature. The reverse obtained at a former period; the alteration has been brought about on the entire removal by extensive denudation of the original crest of *a* as represented by the dotted lines.

Monoclinical Folding is a structure also brought about by earth movements whereby strata have been bent up, as illustrated in fig. 4, which

in fig. 6.* In this section, if the student follows out the black line marked *t*, representing the Triassic beds, for example, and especially in its

FIG. 6.



Fig. 6.—Section showing Inversion south of Lake Wallenstadt, Cantons Glarus and St. Gall.

e. Eocene. *c.* Cretaceous. *wj.* White Jura beds. *bj.* Brown Jura beds. *t.* Trias. *s.* Schistose rocks.

relation to *bj*, he will perceive that in some parts of its course it is completely inverted.

Faults are dislocations in rocks, and necessarily vary much in point of importance; a bed may only be dislocated vertically for a few feet, or whole formations may be broken through and displaced to the extent of many thousands of feet, depending on the magnitude of the movements causing the rupture. The detection of faults is an important part of the work of the practical geologist, who is often able to inform the quarry

FIG. 4.



Fig. 4.—Section across the Isle of Wight to the Mainland, showing Monoclinical Fold running through the Centre of the Island.

a. Hamstead beds. *b.* Bembridge beds. *c.* Headon, &c., beds. *d.* Eocene beds.

e. Chalk. *f.* Upper Greensand. *g.* Gault. *h.* Lower Greensand. *i.* Wealden.

represents a geological sketch section from the south of the Isle of Wight through the island northwards across the Solent to Portsmouth. The monoclinical fold is very pronounced in the centre of the island. If we were to draw the section true to nature, so that the horizontal and vertical scales were the same, the bending would appear much sharper and more localised; in fact, the lower members of the Eocene strata and the uppermost portion of the chalk are often vertically disposed in the island. But we are compelled to exaggerate the vertical scale in order to bring the diagram within a reasonable compass. The section is, therefore, more or less ideal.

Contortion is a stage further, being the result of more intensified earth movements, and is illustrated by fig. 5, which is from a rough sketch

owner or mining agent of the whereabouts of a valuable stratum which has suddenly disappeared by faulting, on being worked into. The extent of faults is also an important factor in many water-supply questions.

OBITUARY.

MR. ROBINSON CORNISH.—The death is announced of Mr. Robinson Cornish, the senior member of the firm of Cornish & Gaymer, builders and contractors, of North Walsham, Norfolk, and John-street, Adelphi. He died suddenly at the age of seventy-three, on the 20th ult., after a few hours' illness, having transacted business all day on the 18th ult. at his works in North Walsham. He carried on the restoration and building of a large number of churches, amongst which may be mentioned Bristol Cathedral and the Abbey Gate House.

FIG. 5.

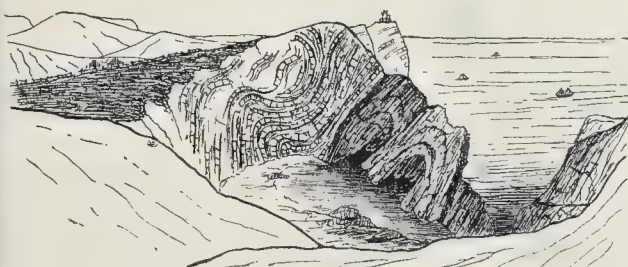


Fig. 5.—Contorted Strata, with Caves, Stair Cove, Dorset.

taken this year of the contorted Purbeck rocks on the coast of Dorset. The action of the sea, combined with other agents of denudation, have succeeded in wearing away two holes in the hard rocks. The Portland beds occur beneath the disturbed Purbeck.

Other, and grander, examples of the contortion of rocks may be found in almost any mountainous region.

Inversion is where large masses of rocks have been so much disturbed by earth movements as to have been turned upside down. This structure is chiefly found in mountainous areas, as illustrated

portions of Canterbury Cathedral, Emmanuel College, Cambridge, and St. Nicholas Church, Yarmouth, under Mr. Pearson, R.A.; Southwell Cathedral, and many church restorations under Mr. Christian; also Selwyn College Chapel, under Sir A. W. Blomfield, A.R.A.; Woodbastwick, Holbrook, Mannington, Gunton, Weston, and Woldingfold Halls. Castle Malwood, Holland House, and the new dental schools at Guy's Hospital under well-known architects. His long experience as a builder enabled him to carry out successfully the most difficult works in connexion with church restoration.

* Geikie's "Text Book of Geology," 1882, p. 518.

GENERAL BUILDING NEWS.

NEW CHURCH IN LEYTONSTONE.—The new church in Leytonstone is now almost completed. It is early English Gothic, and is built externally of red brick with Bath stone dressings and slated roofs. The chief feature in the front is the fine triple-light window with tasteful mullions and tracery. Under this is the central doorway, giving access to a spacious porch, lighted on each side of the door by little window arcades. At one end of the porch a stone staircase leads to the gallery, and at the other end is a cloak-room. Internally the walls are faced with the best yellow brick, relieved with red brick bands and arches, all neatly pointed. The line of the nave, unbroken by pillars, is continued across the opening of the transepts by two pointed arches supported by granite columns. The church consists of a nave and two transepts. The length is 79 ft., and the breadth 37 ft., increased to 60 ft. between the transepts. Sitting accommodation is provided for 496. The architect is Mr. William Wallace, and the builder, Mr. Coxhead, of Leytonstone. The total cost is £4,200.

HOLY NATIVITY CHURCH, KNOWLE.—The decoration of the panels in the arched round the chancel has now been completed. The design consists of a series of angels with musical instruments on a diapered gold background, the draperies being in rich but subdued colouring. The panels in which these are set are formed with a conventional design of ornament in harmony with the architecture of the church. The work has been carried out by Messrs Joseph Bell & Sons.

WALTHAMSTOW PUBLIC LIBRARY.—At a meeting of the Walthamstow Local Board, held at the Town Hall on the 22nd ult., the Library Buildings Committee recommended that the plans prepared by Mr. J. Williams Dunford, architect, of London, for the new Public Library (first portion) should be adopted. After some discussion this was agreed to. On the approval of the Local Government Board being obtained the work will be proceeded with. The plans are now on view at the Town Hall.

ASHTON-ON-RIBBLE, PRESTON.—On the 28th ult. a new Wesleyan Chapel was opened. It is in the Gothic style, cruciform in plan, and is built of brick, faced externally with Accrington patent bricks and Longridge stone dressings. The organ chamber is placed over the vestry, with a room for the choir. A cellar for heating apparatus is formed under a portion of this vestry. On the west corner are a tower and spire 90 ft. high. The total accommodation is for 600 persons. The cost of erection has been about £3,200. The heating apparatus and ventilation combined were supplied by Messrs. Seward & Co., of Lancaster. Mr. James S. Baldwin, of Preston, was the general contractor, and the sub-contractors were: Bricklayer, Messrs. Colley Bros.; mason, Mr. T. Sparling; flagger and slater, Mr. Bradshaw; plasterer, Mr. Geo. Arrowsmith; and plumber, glazier, gasfitter, and painter, Mr. F. Marsden. Mr. W. Barrow is the architect.

BIRMINGHAM.—A number of villa residences are in course of erection at Edgbaston, the most important suburb of Birmingham. Each has three large reception-rooms, wide entrance-hall and vestibule, good kitchen, scullery, cellars, necessary outbuildings, eight bed-rooms, store-rooms, bath-room, &c. The style is Gothic, ornamental wood-work, stone-work, stone-carving, and other decorative features being introduced. The total cost of erection will be about 1,000. The contractor is Mr. Edward Airey, of Gillett-road, and the architect Mr. J. Statham Davis, of Sparkbrook, both of Birmingham.

REBUILDING OF CHERKLEY COURT, LEATHERHEAD.—Cherkley Court, Leatherhead, the magnificent residence of Mr. Abraham Dixon, which was recently destroyed by fire, is now being rebuilt as quickly as circumstances will allow. Cherkley Court was before the disastrous fire which broke out in consequence of the house being struck by lightning, one of the finest residences in the south of England, and commanded a varied and extensive view over the Mickleham, Box Hill, and Rammore country. The main part of the house was utterly destroyed by the fire, and almost the only part saved was the fine conservatory, which was practically uninjured. The rebuilding has been commenced, and is now being rapidly pushed forward. The work has been entrusted to Messrs. Hollands & Hannen, of London. The plans for the restoration of the house have been prepared by Mr. Chambers, architect. A careful examination of the burnt-out building revealed the fact that some of the walls of the house would have to be taken down, though a great part of them were uninjured by the fire. It is hoped that the work will be completed by the end of May. A large staff of men are working day and night to repair damages, the electric light, with which the house was fitted, being used for the night work.

PROPOSED NEW SCHOOL, BARRY.—A site has been chosen for the erection of the proposed new building for the Barry Intermediate School. The plans provide accommodation for seventy boys and thirty girls, and have been prepared by Mr. W. H. Dashwood Caple, architect, Cardiff. The walls of the new building will be built of local bricks, faced with Cattybrook red bricks, and relieved with Corsham Down stone and buff and blue terra-cotta

bands, best Memel timber being used for constructional purposes throughout. The elevations are designed in the Elizabethan style of the English Renaissance period of architecture. The cost will be about 4,500l.

RUNCOORN.—The congregation of St. John's Presbyterian Church, Runcoorn, have decided to erect a new place of worship and Sunday school in Victoria-road. The plans submitted by Mr. T. W. Cubbon, of Birkenhead, have been accepted. The probable cost, including site, is put down at 4,500l., and Mr. W. H. Bleakley, builder, Birkenhead, has been given the contract.

IMPROVEMENTS AT THE GUILDHALL. The City Commission of Sewers have resolved to erect, at an expenditure of about 36,000l., new business premises on the sites of the City Chamberlain's Office and the present Weights and Measures Office, at the Guildhall. We understand, too, that the Corporation are carrying out a scheme for re-arranging the civic offices, which in many respects are inconvenient, and for re-decorating the Council Chamber designed by the late Sir Horace Jones, and illustrated in our columns of December 1, 1889. The old Cash and Freedom offices, and Exchequer, or Mayor's, Court (built 1425), together with the Aldermen's court-room—its ceiling painted by Sir James Thornhill—have been pulled down during the alterations begun ten years ago.

ST. OSWALD'S CHURCH, SMALL HEATH, BIRMINGHAM.—The new church of St. Oswald, Small Heath, which is designed to serve a district populated by about 7,500 souls, which has been carved out of the parish of St. Andrew, Bordesley, was consecrated by the Bishop of Coventry on the 27th ult. The church was designed by Mr. W. H. Bidlake, M.A., architect, of Birmingham. It consists of a chancel with transeptal chapel, organ chamber, and vestries attached, and a nave and aisles of four bays, which it is intended to enlarge at some future time by the addition of two bays at the west end, with public entrance lobbies and a tower and spire. The organ chamber and clergy vestry are placed on the north side of the chancel, and on the south side is the transeptal chapel and choir vestry, the two vestries being connected by a passage behind the altar. The style, broadly speaking, is that of the transition from Early English to Geometrical Decorated, adapted to the materials employed, which are Leicester sandstone with Bath stone facings and plain russet-brown tiles. The chancel arches reach the entire height of the building. The piers and arches of the nave are of Hollington stone and richly moulded brick. The clearstory, lighted by two-light windows with stone mullions and bar tracery in the heads, is very lofty, and is surmounted by an open timber roof covered with boarding of unstained pitch-pine. The sculpture, employed chiefly about the chancel and Morning Chapel, deserves notice. On the north side of the chancel arch supporting the hood-moulding is a corbel representing St. Oswald, Bishop of Worcester, who died 992. On the south side is portrayed Bishop Philpott, the founder of the church. In the Morning Chapel is a delineation of St. Dunstan, and other heads are sculptured on corbels carrying the chancel roof. Beneath the east window, with its detached clustered columns and moulded arches, appear seven angels supporting shields which bear the emblems of the Passion. The chancel, which is approached by three steps, is paved with plain red Ruabon tiles, the seated portions being floored with wood blocks set over cement. The church is seated throughout in pitch-pine, stained a dark green bronze, in harmony with the red brick lining of the walls. At present the accommodation is about 450 sittings, exclusive of the choir. The gas-pendants are of wrought iron, fitted with Stott & Co.'s reflector lights. The whole of the work has been carried out by the contractor, Mr. T. Rowbotham, Small Heath.

ST. PAUL'S CHURCH, WALSALL.—Last week the new church of St. Paul's, Walsall, which has been in course of erection during the last eighteen months, was consecrated by the Bishop of Lichfield. The plans have been prepared by Mr. J. Loughborough Pearson, architect, London, and the work has been done by Mr. Willcock, contractor, of Wolverhampton. The cost will be about 10,000l. The church is spacious and lofty, of early fourteenth-century character, somewhat curtailed in length, in consequence of the exigencies of the site. There is accommodation for 850. The nave is 30 ft. long and 26 ft. 6 in. in width, with wide aisle, giving a total breadth across nave and aisles of 66 ft. It is divided into five bays, the eastern ones, which are a little wider than the others, opening with comparatively low transepts. The chancel has an apsidal termination, and is 38 ft. long and 22 ft. wide, with small side chapel to the south, and a double aisle on the north side, over which is provision for an organ. The vestries, not yet erected, will be east of this. The entrances are north and south, in the western bay, through a shallow porch on the north side, and through the tower on the south side. The roofs are of simple character. Open timber framing for the nave and aisles, and arched and boarded ceilings to the chancel and side chapel. The height of the nave and chancel walls is 40 ft. and 60 ft. to the ridge of the roofs. The aisles are upwards of 30 ft. high. The arcades have a lofty proportion, the clearstory stage being low, and with small narrow windows. The windows

of aisles and transepts are large and richly traciered, and the west window of the nave is especially to be noticed for its size and elaboration. The chancel windows, seven in number, are of two lights and of very lofty proportion, contrasting with the smaller windows of the chapel below. The walls are of coursed stonework; all dressings are of local stone. The roofs are covered with slates. The tower, the lower stage of which is now being commenced, will be 20 ft. square, with boldly projecting buttresses, and with a lofty belfry stage, and is to be surmounted by a stone spire, with angle pinnacles and tall spire lights, the total height of the tower and spire being about 160 ft. Internally the walls are plastered, the floors are laid with tiles.

HUTCHETOWN FREE CHURCH, GLASGOW.—This new church is in the Late Decorated Gothic style. The main gable fronts Dixon-avenue, and rises to a height of about 60 ft. between two broad buttresses with moulded intakes. The lower portion of the gable has two three-light traciered windows, and over these two large and deeply-moulded windows of four lights each, with heads filled with tracery, occupy the full width of the gable between the buttresses. Above there is a low-pitched gable with panelled flanks, and a canopied niche with a sculptured corbel under it, and a foliated cross over forms the terminal feature. On the east side is the hall entrance, and the gable of the hall buildings with a five-light window complete the northern elevation. The principal entrance is elaborately designed. The porch within is finished in stonework, with tiled floor and wood-paneled ceiling. Immediately behind this porch is an octagonal staircase turret. In the turret is an open chamber for bells and bells. The organ-chamber is carried beyond the church in chancel form, with dwarf traciered lights high up in the side and walls. Internally the plan shows a wide and lofty nave, with broad side aisles divided from the nave by massive moulded stone arches of very wide space, supported on clustered columns of polished Labrador syenite. The principal construction of the roof is exposed, and the ceiling lined and panelled in wood, stained to a dark oak tint. In the organ-chamber is a handsome stained glass figure window to the memory of the late Dr. Patterson. Besides the church proper there is a suite of rooms for congregational work. The architect is Mr. John B. Wilson, A.R.I.B.A. and I.A., and Mr. D. Forbes has acted as clerk of works. The following are the contractors for the various departments:—Mason, R. McCord & Son; Wright, W. Cowan & Son; Slater, R. Harris; Plumber, Cairns & Laing; Plasterer, Jos. Graydon; Gas-piping, H. Buchan; Gas-fittings and porch gate, Milne & Son; Railings and gates, McCallum & Hope; Painters, A. & J. Scott; Glazier, Miller & Steele; Stained glass, Jos. Miller; Heating Cornack & Son; Upholstery, F. Smith; and carving, Dawson & Sheriff.

THE NEW MIDDLESEX GUILDHALL AND COURTS.—The Middlesex County Council and Court of Quarter Sessions have now taken possession of the new offices which have been erected on the site of the old Middlesex Sessions-house in the Broad Sanctuary, Westminster. The new buildings, which have been erected from the plans of Mr. Pownall, the County Surveyor, by Messrs. Higgs & Co., at a cost of nearly 200,000l., are of red brick, with stone facings. The building consists of a basement, in which there are sixteen cells for males and three for females, witnesses' waiting-rooms, lavatories, housekeeper's kitchen, and other rooms, together with a beer and wine cellar and the rooms for records. On the ground floor are two courts, private rooms for the chairman and vice-chairman, juries' waiting-rooms, and offices for the clerks and accountants' staffs, cloak, retiring, and luncheon rooms for counsel and magistrates. On the first floor are consulting and waiting-rooms for the juries, with lavatories, &c. There are also private rooms for the housekeeper. On the second floor is an octagonal council chamber, 36 ft. by 36 ft., together with committees' ante, reading, smoking, and cloak rooms. The office of the County Surveyor are on this floor. The fittings and furniture are of oak and walnut, and cost something like 3,000l., in addition to the cost of the building.

THE NEW LONDON AND MIDLAND BANK, BRADFORD.—On Monday the London and Midland Bank in Market-street, Bradford, was opened for business. The banking room is a large hall, 28 ft. by 42 ft., and 15 ft. high, and adjoining it is the manager's room, 13 ft. square. The walls of the bank-room are lined with panelled and moulded mahogany up to a height of 6 ft. Reaching from the top of the dado to a rich plaster frieze is a lining of Pavana marble, banded with Siena marble. A very rich plaster ceiling, painted and gilded, has been put in, the floor is done in mosaic and wood block flooring, and the plank fittings are of mahogany, finely carved. The room is well lighted by day, and fitted with forty-five 16-candle power electric lights for times of darkness. On the first floor there is a suite of offices, and the second floor is arranged in a similar way. The top stories are set apart for the caretaker. The contract for the work generally was let to Messrs. William Ives & Co., but the architect, Mr. James Ledingham, made a number of sub-contracts. The granite was supplied by the Great North of England Granite Company, Peterhead; the marble work and mosaic by Messrs. J. & H.

Patterson, of Manchester; the wrought-iron and metal work by Messrs. Elwood, of Leicester; the electric-light installation by Messrs. Rosling & Matthews, of Bradford; the electric-light fittings by Messrs. Hunt, of Birmingham; and the cabinet work was done by Messrs. Charles Mills & Co.

SANITARY AND ENGINEERING NEWS.

DISPOSAL OF TOWN REFUSE.—At the Rochdale Sanitary Works a new process is being tried. The apparatus is worked on the blast furnace system, the refuse being charged from the top, and as it gets lower down the combustible matter is converted into gas, and the other matter reduced to a liquid state, and taken from the furnace as molten slag. The gas which is so generated can be conducted into any part of the works and utilised for any useful purpose, while the slag is of the smallest possible bulk obtainable from the amount of refuse treated. The experiment so far shows that it is possible to convert the slag into building blocks, concrete, asphalt, and paving blocks.

THE WATER SUPPLY OF GLASGOW.—The drainage area at Loch Katrine is 74.8 sq. miles. Loch Katrine is 367 ft. above the sea. The storages amount to ninety-five days' supply. At the head of the loch the rainfall is heavy, frequently being over 100 in. per annum. The aqueduct to Glasgow is 25.5 miles long, and contains 550 million gals., on a supply of 50 gals. per head for eleven days. The total cost of the works was close on one million and a-half. The new powers will allow the Corporation to duplicate the first works. When the sides of the loch were raised, they would contain 15 thousand million gals., and this will probably meet all the requirements for forty years to come.

KRISTIANSTAD.—On Friday, September 26, Colonel W. M. Ducat, R.E., one of the Local Government Board Inspectors, conducted an inquiry into the application of the Local Board for sanction to borrow 10,500l. for improving the water supply of the town, at the Town Hall, Redruth. The chairman of the Board, Dr. Pernemann, entered into particulars with regard to the existing supply and the necessity for new works. The scheme was explained by Mr. H. Bertram Nichols, C.E., of Birmingham, the engineer, who was present with his plans and estimates. Two reservoirs were originally proposed, but the clerk stated, on account of the second reservoir being abandoned, 9,500l. would be required instead of 10,500l.; there would then be a storage capacity of 4,500,000 gallons. After the inquiry the inspector, accompanied by the chairman, the clerk, the Surveyor to the Board, and the engineer, visited the principal sources of supply, at Penstruthal and Gordon, also the site of the proposed storage reservoir at Sandy-lane and the existing sources of supply.

THE PUBLIC BATHING PLACE, READING.—The bathing place has been undergoing extensive alterations and enlargement, under the direction of the Borough Surveyor of Reading, Mr. Arthur El Collins. The dimensions of the bath as now enlarged are:—Length 230 ft. and breadth 60 ft., giving a water area of 1,400 square yards. There is an ample depth of water in the bath, the bottom, which consists of 6 in. of concrete, having a gradient of 1 in 60. The south end of the bath is especially arranged for learners, there being a depth of 3 ft. of water at that end. Nine large dressing-boxes have been constructed at the north end, and at the south end is a brick building which is arranged as a ticket office, with lavatories, etc. The sluices are constructed so that the water may be allowed to enter or leave the bath either under or over the sluice doors. This arrangement was deemed necessary, as by lowering the sluice-door it will allow all leaves, etc., floating on top of the water to run off. By raising the sluice-doors the water leaves the bath from the bottom, and assists in washing out also sediment that may accumulate. The water may be admitted to, or discharged from the bath at either end. A high iron fence has been erected around the bath, and at the south end the fencing has been carried up to such a height as will prevent the interior of the bath from being seen from the railway. The clerk of the works is Mr. George Fitton of the Borough Engineer's office. The general contractors to the bathing place are Messrs. Jenkinson & Son, of Leamington. Mr. A. J. Ellis, of Reading, was contractor for the trough leading over the culverts, and Messrs. Lysaght, of Bristol, were the contractors for the iron fencing and iron roofing for whom Mr. A. J. Ellis is erecting the iron roof and screen fences. Reading may now congratulate itself on having one of the finest open-air swimming baths in the country.

FOREIGN AND COLONIAL.

FRANCE.—The Government has instructed M. Remy, the well-known medalist, to execute a commemorative medal to be distributed to all the French artists who have taken part in the Chicago Exhibition. —The new 100-fr. note, issued by the Municipality of Paris, is to be opened on November 1.—The small town of Andely, inaugurated, on September 24, a monument to the

memory of the painter Chaplin. The monument, which will consist of a bust of the eminent artist placed on a stone pedestal ornamented with a palette in bronze, is the work of M. Etienne Leroux.

A fine Roman Mosaic has recently been discovered in a field at Flacelles-Maron (Saône-et-Loire). It shows a design of a square medallion enclosing a figure of a gladiator wearing a helmet and armed for combat. The mosaic is well preserved. It measures about 8 mètres by 5, and is supposed to belong to the first century A.D. — At Nîmes, on September 30, was inaugurated a memorial bust of M. Paulin Talabot, founder and former director of the Paris, Lyons, & Mediterranean Railway, the bust being executed by the present engineer-in-chief, M. Noblemaire, a director himself of the company, and an amateur artist of great talent. — At Bruville (Meurthe-et-Moselle) a fine monument, designed by M. Aubé, has been erected to the memory of 880 soldiers killed at the battle of Rezonville-Gravelotte, on August 16, 1870. — The Fine Arts Exhibition at Rouen was opened, on September 30, by the Consul-Général de Vaulchuse. It has opened a public subscription to erect a monument to the memory of Gambetta, at Carailon. — It is announced that M. Thorand, a large contractor and manufacturer of cement at Yverppe, has been granted the decoration of the Legion of Honour. M. Thorand contributed largely to popularise the use of cement in public works in France. — The jury of the competition opened at Médéah for the construction of a group of schools and a covered market have awarded the first premium to M. Laillet, "engineer-architect," of Amiens, and the second to MM. Bourgeois of Passy and Cave of Paris, architects. — The death of M. de Philippeville (Algeria) of M. Albert Ribaucour, engineer, "Ponts et Chaussées," and a distinguished geometer, to whom we owe the construction of the Saint Christophe Basin in the Bouches du Rhône. The syphon system which he contrived for the carrying out of that work gained him a medal of honour at the 1889 exhibition. — M. Ernest Guillaume, member of the "Société des Architectes de Saône et Loire," has died at the little town of Saint-Claude (to which he was architect) at the age of forty-five. — The church of Quillebeuf has been entirely destroyed by fire, the work apparently of an incendiary. — The jury of the competition opened by the town of Nice for a monument to commemorate the annexation of the Nice province to France has awarded the first premium to MM. Allar (sculptor), and Jules Febvre (architect), of Nice; the second premium to MM. Lombard (sculptor) and Redon (architect), of Paris; the third to MM. Dame (sculptor) and Breffendille (architect), also of Paris. — M. Henri Degré, architect, of Dijon, has just died at Abuy, at the age of seventy-five. He was student in the Ecole des Beaux-Arts and in the atelier of Labrousse. For more than thirty years he took part in all the works carried on for the improvement of Dijon. — The statue of Chevreul is to be inaugurated at Angers in the course of the month of October.

DENMARK.—An international exhibition of electric motors is being held this autumn in Copenhagen, promoted by the Danish Society of Handicraft and Industry. There are twenty-three exhibitors, some German, French, and American, but no English. The frontal figures of the splendid new premises of the Great Northern Telegraph Company of Copenhagen are being modelled by the celebrated Norwegian sculptor, Herr Stefan Sinding. They were recently described in our columns. — The Copenhagen Telephone Company has decided to erect new central premises for the accommodation of about 10,000 subscribers. The principal hall will have a length of 140 ft., and a breadth of 40 ft., with a vaulted roof and lighted from above. It will be equipped with every modern appliance of telephony. — It has been decided to erect two new national schools in Copenhagen, at an aggregate cost of about 250,000 kr., the principal interest in them being that experiments are to be made with gas stoves for heating instead of coke and coal stoves, as the former have been found to answer very well in other municipal buildings. — The fundamental works of the new Copenhagen Town Hall are now rapidly progressing, the excavations, &c., having been completed. — A great and interesting engineering work is now in progress in Denmark, viz., the construction of a great breakwater at the Hirsals Lighthouse, facing the North Sea. The contractor is Herr Kirk, who has great experience in this kind of work. — The restoration of the old Copenhagen monastery, the Helligaandskirke, is progressing favourably under the direction of Professor Storch. In the interior the plaster of the walls is being removed, exposing the original red stonework. A number of old Mediaeval windows have been reopened. It is intended to use the refectory in future as a church. — The report of the Aalborg Portland Cement Works for 1892 shows that very good progress is being made, the article now turned out being equal to Stettin cement, "which," says the report, "is far superior to any English brand." Danish cement is ready a ready sale at home, in Scandinavia, Russia, Germany, and even North America.

SWEDEN.—The municipal authorities of Stockholm have voted a sum of 340,000 kr. for the erection of

an asylum for the insane poor, and 50,000 kr. for extraordinary cholera precautions. — The work of establishing an Industrial Palace in Stockholm, i.e., a permanent exhibition of Swedish industries and arts, has now been completed. The building has been designed by Herr G. Lindgren and Herr Möller, architects. It is situated on the Avenue Karlavägen, and was commenced twelve months ago, but a fire in May last delayed the work. The cost is 140,000 kr. The building is circular in shape, with winter gardens and a restaurant attached. The interior is lighted from above at night with Welsbach glow lamps. — A recent issue of the only Swedish sanitary organ, the *Hälsövern*, contains an article by Professor E. Almqvist, a well-known sanitary reformer, on the great importance of the filling used between floors in dwellings as regards health in Sweden, where old ground mortar is generally used for filling the space between the beams of floors so as to arrest noise, and retain heat. Professor Almqvist considers such *débris* highly dangerous to health, inasmuch as they contain sometimes upwards of one-half per cent. hydrogen and an equal volume of chloride of seven-and-a-half kilos per cubic metre. In addition, there is the large quantity of dirt found in this stuff. He fears that many cases of diphtheria, typhus, typhoid fever, and lung disease have been caused by the impure fillings of the floors. In hospitals, of course, the dangers are much greater. To the latter the author suggests the adoption of cement floors, covered with linoleum for warmth's sake, such as is the case in Berlin and Hamburg, or, better still, asphalt; but as this material is not attractive by its colour, it might be plugged with wooden blocks in neat designs, such as is the case in the new Gothenburg Hospital. — "Kärnan," at Helsingborg, a striking object at the entrance to the Sound, an old historical ruin of a Viking stronghold, in the shape of a huge square tower, is to be restored by the Crown at a cost of 15,000 kr.

BRUSSELS.—The Triennial Art Exhibit has been opened by the King. Its site is on the ground formerly occupied by the old Law Courts, the exhibits being housed in provisional buildings of the simplest kind. The show was organised by the King with the assistance of the Home Secretary and a managing committee of artists and laymen, the "hanging jury" consisting partly of members of the committee and partly of delegates of the would-be exhibitors. The excellent catalogue published by Mr. Lyon-Claessen contains 1,250 numbers, including some referring to public monuments not within the exhibition halls, which could, however, be entered for the diploma and medals according to the special conditions for sculptors. The exhibition closes on October 30.

MISCELLANEOUS

DECORATIVE ART SCHOOL IN FLORENCE.—According to a recent report of the United States Consul at Florence, a decorative art school under the patronage of the King of Italy was established in that city on October 23, 1889. It is supported by an unlimited number of shares at 98.74d. each per year; voluntary donations, yearly payments of 3s. per pupil; subsidies granted by the Florence Chamber of Commerce, the ministry of agriculture, commerce, and industry, the municipality, &c., and by other donations amounting to a total sum of 1,103,155. Instruction is given in architecture, artistic ironwork, painting, sculpture, wood carving, and decorative design generally. The course of study lasts for four years. The scholastic year extends from September to July. Lessons are given daily for four hours in the morning, attendance for the first three hours being compulsory, and for the fourth hour, optional. Pupils are received from the age of twelve years. The pupil, having fully completed the course of instruction and training, and after successful examination, is granted a certificate *ad hoc*, specifying his attendance. The institution is at liberty to retain any part or the whole of the work produced by the pupils. The professional school of industrial decorative arts in Florence proposes to give artistic and technical instruction adapted more to the development of Florentine industries based upon the arts of drawing and modelling. The school is, therefore, more especially intended to give a training to young men in these two accomplishments, as applicable to all and any industrial decoration and designing. The course of study extends over four years, two being for elementary or preparatory classes, one for intermediate or special training, and the remaining year for advanced or practical work. The number of industrial pupils for the year 1892 was 127.

BROCKWELL PARK.—A monument to the late Mr. Thomas Lynn Bristowe was inaugurated at Brockwell Park last Saturday. It consists of a bust of the deceased, over life size, mounted on a high pedestal with ornate capital. On the front of the pedestal stands in full relief a life-size figure of "Perseverance" presenting a branch of laurel; in the base under the statue is a bronze panel, gilt, of children at play. This pedestal stands on a massive plinth, with a projecting drinking fountain of elliptical form in front; at the back is a metal door enriched with a labyrinth to amuse the children. The entire memorial stands about 16 ft. high and is constructed throughout of white mountain limestone.

The work was designed by Mr. W. Brindley and has been executed by Messrs. Farmer & Brindley. The figure sculpture being modelled by their artist, Mr. L. Chavalland.

A TRIBUTE TO THE MEMORY OF BURNS.—A statue of Robert Burns, erected in the Free Public Library of Belfast, as a tribute to the memory of Scotland's national poet, was unveiled on Tuesday, the 19th ult., in the Art Gallery of that institution, in the presence of a numerous assembly, and, as a work of art, is deserving of commendation. It stands about 7 ft. in height, and is by George A. Lawson, H.R.S.A., and cast in bronze from the model prepared by that gentleman for the colossal statue of Burns unveiled at Ayr in 1891. It is erected upon a polished pedestal of red granite. The pedestal bears the following inscription:—"Robert Burns, 1759-1796. Presented by his countrymen and admirers in Belfast."

UNIVERSITY COLLEGE.—The customary free opening lectures at the University College, London, will begin on Tuesday evening, the 10th inst., at 7.30 p.m., by Professor T. Roger Smith, who has chosen for his subject, "An Architect's Books," a subject on which there is a good deal to be said which ought to prove interesting to students. The classes begin work the same and the following week. The classes for Architectural and Structural drawing, maintained by the Carpenters' Company, are also resuming work at this college.

BOROUGH POLYTECHNIC INSTITUTE.—The classes in this Institute which is intended for giving technical education at a low rate, include Art classes in Freehand Drawing, Modelling, Perspective, &c., and special classes on Elements and Principles of Ornament. The Science classes include Building Construction, Applied Mechanics, Technical Drawing, &c. Under the head of "Technical and Trade Classes" instruction is given in Carpentry, Brickwork, Plumbers' Work, and Builders' Quantities. Woodcarving and Modelling are also taught.

TRADE CATALOGUES.—Mr. Archibald D. Dawney's catalogue of constructional steel and iron work contains, besides a number of sections of girders, a useful and minutely drawn section of a public building recently erected of constructional steel-work and fire-proofing. From Mr. F. A. Fawkes we have a very handsome illustrated catalogue of the wooden chimney-pieces, overmantels, panelling, &c., made at his joinery works at Chelmsford. These are mostly in very good taste, and superior to the average of stock designs.

NEW CONCERT ROOMS IN LONDON.—It is expected that the Queen's Hall (originally named Victoria Hall), will be opened in the course of this month. The premises have been built upon the east side of Langham-place, at the corner of Riding House-street, and opposite Nash's Church of All Souls. It will have a capacity of 3,000, with an orchestra for a band and a choir of 500 performers; the organ is by Messrs. Hill. On February 14, 1891, we published a perspective view of the elevation and plan, on street level, with a description. From some correspondence which was printed subsequently in our columns it appears that plans and designs were prepared in 1887, by Mr. C. J. Phipps and Mr. T. E. Knightley, as joint architects; whilst the architecture, within and without, the acoustic arrangements, external loggias, and construction are by Mr. Knightley. The rebuilding of Messrs. Erard's premises in Great Marlborough-street, will include a recital hall, for 400 seats, on the first floor, and additional show-rooms for the pianos.

PATRINGTON, EAST YORKS.—A new turret-clock has just been erected in St. Patrick's Church which shows the time upon three external dials, and strikes the hours upon the largest of the five bells in the tower, the work having been executed by Messrs. William Potts & Sons, Leeds.

IMPROVED WASHHAND TROUGH.—Messrs. Emley & Sons, of Newcastle-on-Tyne, send us an illustration and description of their marble wash-hand trough, in which a continuous supply of water is admitted from a pipe beneath the water level, placed at the back of the trough and discharging towards the front; a continuous wave is thus formed from back to front and returned from the front to a weir at the back of the basin, lower than the front edge, over which the water escapes. The object is to keep the water in the trough constantly in motion and to carry off the used water continuously. Soap-boxes are fixed at intervals over the trench at the back into which the weir discharges. The trough seems well adapted for schools.

BIDSTON HILL PARK, BIRKENHEAD.—The threatened appropriation or disposal of Bidston Hill for building sites some time back caused much alarm and annoyance to the inhabitants of Birkenhead, Tranmere, and vicinity, by whom the hill has been much used. Steps were taken and a committee appointed to see if anything could be done towards saving some part of the large open space for the use of the public. The efforts of the committee have been successful, and the larger of two proposed schemes will be carried out. At a meeting of the general committee of the Bidston Hill Purchase Fund, on September 26, it was stated that a provisional agreement had been come to between the owner and the purchase committee, by which the latter had acquired an area of from 45 to 47 acres of the summit of the hill, extending from the Park

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Prizes.	Designs to be delivered.
Baptist Chapel, Schools, &c. Stafford	Committee .....	.....	Oct. 31
Road Works, Ashdon-on-Money, Cheshire	Altrincham R.S.A. .....	.....	do.
Office Offices and Cells	Colchester Corp.	100l.	Dec. 1
*Gresley Road Bridge over River	Flintshire C.C. .....	.....	do.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Road Works	Chestnut Local Board	S. Twiss	Oct. 9
Road Works, Ashdon-on-Money, Cheshire	Altrincham R.S.A.	J. McKee	do.
Sewering, Levelling, Paving, &c.	Bowdon Local Board	J. Newton & Son	Oct. 10
Street Works, Knowles-street, Dudley Hill, near Bradford	Tong Local Board	M. Outwaite	do.
Street Works, Armoury-street, &c.	Stockport Corporation	J. Atkinson	Oct. 11
Main Sewer .....	.....	.....	do.
Sewerage Works, Gatesley-road, &c.	Chadwick and Gatesley Local Board	E. Sykes	do.
Public House, Chapel-end, Nuneaton	P. Phillips & Co.	T. F. Tickner	do.
Well Blanking, Bridge Bridge	Hastings Corporation	P. H. Palmer	do.
Bridge, Ulverston-street	Bolton Corporation	W. H. Brockbank	do.
Setting Boiler, Beata, &c. Marton-street	Lancaster Corporation	J. Cook	do.
House and Premises	Bedlington (Northumberland) Coal Co.	W. Sykes	do.
*Making up Roads	West Riding C.C.	J. Vickers-Edwards	Oct. 12
Stables, &c. Finsbury, Bradford, Yorks.	Southill Nether Loc. B.	M. Paterson	do.
Additional, &c. to Lock Barnaby	A. Lomas	P. M. Beaumont	Oct. 13
Bridge, Springwell, Hatfield road .....	.....	.....	do.
Farm Buildings, Lancaster Hall, Essex	Fairbank & Wall .....	.....	do.
Pair of Non-attached Villas, Mount-lane, Shipley, Yorks. .....	.....	.....	do.
*Alteration to "The Duffryn," near Cardiff	J. Cory	E. A. Landow	Oct. 14
Two schools, Classrooms, &c. Wye, Kent	Governors	S. S. Grubb	do.
*Sewerage Works	Windsor R.S.A.	W. Menzies	Oct. 16
*School Buildings and House, Potter Heigham, Norfolk .....	.....	A. S. Hewett	do.
Sanitary Pits, &c.	Ran-bottom (Lancs.) Local Board	A. W. Smith	do.
Sewerage Works, Heaton	Bolton R.S.A.	M. W. Atkinson	do.
*Cottage, Sutton	South Metropolitan School District	K. R. Crackmay	do.
*Engineering Work	Poplar and Stepney Sick Asylum Dist.	A. & C. Harston	Oct. 17

CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Nine Houses and Outbuildings, Hemsworth, Wakefield	Barnsley British Coal Soc. Ltd.	Senior & Clegg	Oct. 17
Drainage Works	Tiverton, R.S.A.	J. Greenwood	do.
Residence, Sutton (Yorks) .....	.....	S. Jackson	do.
Granite Road Metal, 600 tons	Dover Town Council	Official	do.
*Road-Making Works	Brough & Loe. Bd.	do.	do.
*Earthworks and Drain Pipes	Boro of Craydon	do.	Oct. 18
*Building Materials .....	.....	do.	do.
Water Supply Works	Elbow Vale Loc. Bd.	T. J. Thomas	do.
Granite Road Metal, 375 tons	Shirley and Presnall Loc. Bd.	H. J. Weston	do.
*Road-Making Works	Sutton (Surrey) L.B.	A. D. Greatorex	do.
Purifying, and Lime House, Ripon road	Barrovec Gas Co.	T. Newbigging	Oct. 19
*Enlarging Post-Office, Bolton	Com. of H. M. Works	Official	Oct. 20
Granite Road Metal (700 tons)	Bishop Stafford Loc. Bd.	do.	do.
*Sinking, &c. of a Well	Bilton Imp. Com.	B. Latham	Oct. 21
*Board School	S. H. M. C.	do.	do.
*Workmen's Dwellings	S. H. M. C.	W. Drew	do.
*School Furniture	Walthamstow Sch. Bd.	Official	Oct. 24
Bridge over Railway, Cotes Hill	G. W. R. Co.	J. Fraser	do.
Additions to Asylum, Armagh	Com. of Control	Official	Oct. 23
*See Baths	Wolverhampton Sch. Bd.	H. J. Pines	Oct. 27
*School	Wolverhampton Sch. Bd.	T. H. Fleming	Oct. 28
*Sewerage Works, &c.	Lewisham Bd. of Wks.	Official	Oct. 31
Cottages, Terrace, &c.	Gen. Culturore	Day & Sailer	No date
Pipe Laying, 4,000 yds. (Ryton, Yorks)	British Explosives Syndicate	E. N. Cullett	do.
*Children's Cottage Homes, &c.	Sheffield Union	C. J. Innes	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Foreman of Works Gold Coast	Crown Agents for Colonies	2500l. to 2600l.	Oct. 16
*Estimating and Measuring Clerk	London County Council	2000l.	do.
*Assistant in Works Department .....	.....	2000l.	do.
*Architectural Draughtsman .....	.....	2000l.	do.
*Architectural Draughtsman .....	.....	2000l.	do.
*Ordering and Assistant Quotation Clerk .....	.....	2000l.	do.
*Chief Clerk .....	.....	2000l.	do.
*Assistant Surveyor	Civil Service Com.	2000l.	Oct. 18

Those marked with an Asterisk (*) are advertised in this number. Competitions, p. iv. Contracts, pp. iv., vi., viii., and xxv. Public Appointments, pp. xliii. and xxv.

Cottage to Upton-road, with a strip 150 ft. wide from the wall on the west side, for the sum of 12,100l. Of this amount, 9,740l., including 5,000l. from the Corporation of Birkenhead, had been collected, leaving, with legal and other expenses, 2,500l. to be raised. The inhabitants of Birkenhead and Liverpool, with the latter of whom especially the hill was a favourite resort, are to be congratulated, because, if they had allowed the opportunity of acquiring the site to pass, they might not have another.

KING'S COLLEGE. — We have received the prospectus of classes and lectures at King's College for the ensuing term. The day classes are intended to furnish full information on the theory and practice of architecture and building construction, and in the application of the principles of mechanics to construction. The Monday lectures by Professor Banister Fletcher will deal with the subjects of Architecture, and its History; Foundations; Brickwork; Building Stones; Timber, its several forms and uses; Iron, and its Use in Building; Materials, strengths, stresses, and strains; Limes, Cements, and Concrete; Masonry; Fireproof Construction; Carpentry (roofs and their constructions); Plastering and Materials; Plumbing and Sanitation; Shoring; and Model Bye-Laws.

A WARNING TO BUILDERS. — Mr. Clarke was summoned at the Worship-street Police Court on Tuesday last as the builder who had commenced the erection of a very large warehouse building without giving notice to Mr. Henry Tongrove, District Surveyor of South Islington and Shoreditch. The magistrate, Mr. Rose, ordered a penalty of 5l. and costs.

KIRKSTALL ABBEY. — A large party of antiquaries and others interested in the relics of the past betook themselves to Kirkstall on the 28th ult., the meeting being promoted by the Yorkshire Archaeological Society. The work which has for some time been in progress at the abbey, with a view of preserving it, has been watched with anxiety by many whose keen and scientific vision has detected, or apparently detected, a spoliation of the ancient grandeur of the ruins. The members of the Archaeological Society were determined to investigate matters for themselves, and very kindly extended the hand of good-fellowship to the Thoresby Society, whose members they invited to join them. Mr. W. H. St. John Hope officiated as guide, and conducted the party over the ruins and the recently-excavated portions. Assembling first in the old cloister, Mr. Hope called attention to the fact that during the past few years various changes had been made in the external appearance of the abbey, the walls of which had been rapidly mouldering away from the effects of the

frosts and rain, so destructive to everything that was left exposed in this country. In all abbey ruins of the Cistercian order they would observe a distinction between parts pertaining to the monks and those used by their lay brothers. The line of demarcation was easily fixed. Taking the ground plan as a whole, the arrangement of that abbey was remarkably complete. In the centre was the cloister quadrangle, wholly surrounded. The plan of the church, too, was thoroughly complete, there being the Cistercian nave of considerable length, with its central tower, its transepts, and its choir. Mr. Micklethwaite, the architect, explained that at the time the ruins became the property of the Leeds Corporation, many parts of them were in an absolutely dangerous condition. Many people had abused them for taking off the ivy. If they had the ivy they could not have the building. If it were only ivy they wanted, they could find it on almost any old barn, but once lose a building like that abbey, and they could not replace it. The question was whether they should preserve the abbey or leave it in its picturesque but perishing condition. True, there was a good deal of new work, but the reason was that when the tower fell, owing to the failure of one of the pillars, it brought down a large quantity of masonry with it, while what remained was severely shaken. Although some measures were taken for propping up what was left, it was very little good, permanent propping being necessary. How could this be done? It was thought best to rebuild, after a fashion, the fallen pier, and turn arches on to about the broken arcades. If they looked carefully at the pillars, which had been restored, they would notice a great many of the old stones, which, wherever possible, had been put back in their old places. What had been done was not so much with a view of reproducing what had gone as to preserve what was left. To rebuild the tower would not only be a very great and expensive undertaking, but almost a structural impossibility.

REMOVAL OF GATES AND BARS AT THE WEST END. — Mr. F. Dethridge, Vestry Clerk of Paddington, has received a letter from the London County Council stating that the obstructions in Devonport-street and Hyde Park Gardens will be removed early next month, under the provisions of the London Streets (Removal of Gates and Bars) Act, 1893. Steps are being taken with a view to the removal of gates and bars at the Marylebone-road end of Harley and other streets in Marylebone.

THE JOINERS AND CARPENTERS ON THE CLYDE. — Another dispute has arisen between the Clyde joiners and carpenters, and the lock-out seems probable. Upwards of 300 joiners are out on strike, while over 200 carpenters and joiners residing in

Partick and Whiteinch, and employed at Clydebank were yesterday put on three-quarters time. All the joiners and carpenters at J. & G. Thomson's yard, except those employed on the Inman liner nearing completion, have been put on short time.

COLLAPSE OF A RHENISH HOTEL. — The newly-built hotel of the Golden Dragon, near Knigs-winter, situated in one of the most beautiful parts of the Rhine, fell in on Saturday, burying in its ruins seven workmen, four of whom were killed.

THE NEW HARBOUR OF DOVER. — Extensive machinery has been put down for making the concrete blocks which are to form the base of the submarine work. Each block weighs about 20 tons, and measures 12 ft. by 12 ft. by 12 ft. These blocks will be made at the rate of 100 per week, and the work has already commenced. Several spans of the iron viaduct have been fixed in place, and it is expected that this portion of the work will be finished by the autumn of next year. The first set of blocks will be laid from an island stage which is being constructed in the bay, and will be set by divers using either the bell or the ordinary derrick. Every effort is being made to push on the work, and with favourable weather it is expected that 1,500 ft. of the new projecting arm will be finished by the end of next year.

IRON AND STEEL INSTITUTE. — The members of the Iron and Steel Institute continued their Autumnal Session at Darlington last week, and discussed papers dealing with various subjects, including coal washing, the modification of carbon in iron, and the development of iron and steel wire manufacture. Afterwards they visited several forges and steel works in the neighbourhood.

FALL OF A ROOF AT WESTMINSTER. — A serious accident, resulting in the death of one man and very serious injury to another, occurred on the premises of Mr. D. Charteris, builder, Earl-street, Westminster, on the 27th ult. A number of men were employed in one of the buildings in the yard, used as a workmen's shop, in clearing away a quantity of shoring and timber, when the roof suddenly collapsed. Two men, named respectively Davis and Ferguson, were buried, and it was a considerable time before they could be extricated. Two large beams, together with a mass of masonry, were precipitated upon Davis, and when rescued the unfortunate man presented a shocking appearance. He was immediately conveyed to the Westminster Hospital, but died within a couple of hours. At the inquest Mr. Charteris, the employer, said the flooring was constructed in the usual way about a month ago. There were in all six beams, and the whole rested on brick walls, the weight being equally distributed. There were no intervening columns

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The Staircase, Imperial Institute.—Mr. T. E. Colcutt, F.R.I.B.A., Architect.....	Double-Page Ink-Photo.
West Front of the Cathedral for the new Lucknow Diocese, India.—Mr. W. Emerson, F.R.I.B.A., Architect.....	Double-Page Photo-Litho.
New Public Library, Colchester.—Mr. Brightwen Binyon, A.R.I.B.A., Architect.....	Single-Page Ink-Photo.
A Doctor's House in the Country.—Mr. E. B. Lamb, Architect.....	Single-Page Ink-Photo.
Detail of Main Gable, Colchester Public Library.—Mr. Brightwen Binyon, Architect.....	Double-Page Photo-Litho.

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Report of the Summer Excavations at Troy.



OUR readers are already aware that the excavations at Hissarlik, brought to an untimely end by the death of Dr. Schliemann, in 1890, were resumed this year

by Dr. Dörpfeld, the necessary funds being placed at his disposal by Mme. Schliemann. The work was begun on May 1, and went on to July 11. Dr. Dörpfeld took with him as coadjutors—for architecture, Herr W. Wilberg; for Greek archaeology, Herr A. Rückner; and for prehistoric remains, Herr W. Weigel. The full publication of the discoveries is to appear in the course of the winter, meantime, a provisional report is published in the last issue of the *Athenian Mittheilungen* (band xviii., zweites Heft).

We are glad to see that the results of the expedition have considerably exceeded the hopes entertained. What precisely these results are will best be understood by a brief résumé of the state of the case when Dr. Schliemann closed his work in 1890. In the "Ilios," or "Troya," it will be remembered, seven strata, or "cities," are noted and described. Dr. Schliemann's last excavations increased the seven to nine. Besides the sixth, or, as he called it, "Lydian" stratum, and the seventh or Roman one, two other strata came to light, which, from the objects found in them, unmistakably belonged to respectively early and late Greek dates. A further result of the 1890 excavations was that the date of the sixth stratum was fixed, and two buildings of substantial dimensions found within it. Besides the so-called "Lydian" pottery he found in this sixth stratum, there came to light a mass of fragments and some whole vases of the Mycenaean ware. From this it was deduced, and rightly, that in the sixth stratum, to which hitherto but little attention had been paid, we have a civilisation contemporary with that of Tiryns and Mycenae. It was tempting to go further and see in this stratum the city of the Trojan War; but as no buildings only had been brought to

light, and no city wall could with certainty be identified, it was felt that till the sixth stratum was fully explored any such conclusion would be rash. The city lying two strata beneath, with its imposing remains of dwellings, city walls, towers, and gates, had strong claims to preference, but the objects found within that stratum were inconveniently primitive and distinctly pre-Mycenaean.

This doubt, this divided claim between the second and the sixth stratum, to be the "Homeric Citadel," has been by the recent excavations completely set at rest. The sixth stratum, of which a considerable part has been completely excavated, has shown itself to be the most imposing fortified citadel that ever—previous to Roman days—occupied the hill. The remains of seven large buildings have been laid bare. Their ground plan is something like that of a Greek temple, and of the *megara* of Tiryns and Mycenae, but their proportions are larger and the masonry superior. The most striking of the buildings discovered is a large hall situated about the middle of the citadel. The hall itself is 9 metres broad by 11½ long, and it is furnished with a portico, oriented N.W. From the remains of stone bases the hall seems to have been divided by three wooden columns into two naves; it seems, in fact, to have closely resembled the temple excavated by R. Koldewey, at Neandria. Whether the building at Hissarlik is actually a temple or not, cannot at present be decided.

The citadel of this sixth stratum is fortified by a wall 5 metres broad, and in some parts still standing several metres high. The north-east corner is faced by a massive tower about 18 metres in width, and still standing over 8 metres high. In size, solidity, and finish of work, this tower is second to none other of Greek date—in fact, so admirable is the masonry, that the suspicion might have arisen that it was of historical date; but fortunately in parts it can clearly be made out that in historical times it was added to and built over. Within the seven buildings of this sixth stratum have been found abundant remains, not only of the local "Lydian" ware, but also of Mycenaean fragments; moreover, between this sixth stratum

and the one of Roman date, two intervening strata are clearly to be made out, hence it seems evident that in the sixth stratum, if anywhere, we have the veritable Homeric remains. Its area is about that of the citadel at Tiryns, and is at least double that of the "city" of the second stratum. It stands about 28 metres above the plain.

Whether to this citadel there corresponded a lower city in the plain, as is the case at Mycenae, is as yet undetermined, but from tentative excavations made it seems probable. About three-quarters of a mile south of the Acropolis a quantity of "Lydian" fragments were found, and mixed with them Mycenaean pottery, and one urn came to light of pottery corresponding to that of the sixth stratum and with traces of burial by burning, and which, of course, all agree well with Homeric methods.

Supposing that the sixth stratum is the Homeric Troy, it follows, of course, that the substantial city of the 2nd stratum must go back to a date earlier than that of any similar European structures—probably to 3,000 years B.C.—and even earlier must be the primitive settlement of the first stratum. In order to satisfy himself that the stratification thus arrived at was really correct, Dr. Dörpfeld sank a small shaft on a portion of the hill still untouched; in this experiment he proceeded with precautions unfortunately neglected on Dr. Schliemann's work. As each layer was reached, its contents were noted, and before any masonry was removed to reach the next layer it was measured, drawn, and photographed. The result was that the consecution of strata noted in 1890 was completely confirmed, even to minute subdivisions. For clearness sake we give the strata as now established, divided, as Dr. Dörpfeld classifies them, under three main heads:—

I. Pre-Mycenaean or pre-historic strata.

(a) Primitive settlement = first stratum.

(b) Imposing fortified citadel with dwelling-houses, citadel walls, towers, gates = second stratum.

(c) Three unimportant settlements erected on the ashes of the second stratum = third—fifth strata.

II. The Mycenaean stratum or the Homeric Pergamos = sixth stratum.

- III. The post-Mycenean strata.
 (a) Archaic dwelling-houses = seventh stratum.
 (b) Greco-hellenistic dwelling-houses = eighth stratum.
 (c) Imposing Roman structures = ninth stratum.

We have given here an abstract of the report in the *Mittheilungen*—the opinions are those there expressed—till the actual material is published independent opinion will necessarily be impossible. On his own supposition that the sixth stratum is the Homeric Troy, Dr. Dörpfeld is full of natural regret that Schliemann himself did not live to see the palaces of Troy exhumed. He did see the first structure discovered, and a few Mycenæ vase-fragments, and recognised their importance. Much of the sixth stratum still remains undiscovered, but we are not told if M^{rs}. Schliemann continues next year her work of pious memorial.

CONSTRUCTIONAL ARCHITECTURE AT THE CHICAGO EXHIBITION.



UNDER the head of constructional architecture a variety of architectural exhibits may be conveniently grouped without reference to their classification or their mutual relationship one to another. Some that properly belong to this topic have already been considered in treating of stone and brick; others not so related may now be taken up. Most of these are of American origin, few foreign countries, as we have previously pointed out, being represented in architecture or allied subjects. Belgium, which is the most voluminous non-American contributor to architecture and its allied branches, sends a very good representation of the products of the Vieille Montagne Zinc Co. The exhibit is housed in a small zinc pavilion, of very bad design, by the way, and consists of models of the various forms of roofing made by this company, with actual specimens of the materials. The models of roofs are well made, and the variety of forms interesting and good. A special representation is made of the double-ribbed zinc roofing plates, in which extra strength is sought by double ribs instead of the ordinary corrugated or roll cap surface.

Roofing materials of various sorts are well represented in the American section. These fall naturally into two classes, roofing tiles and metallic roofing. Metallic roofing is apparently the more popular of the two, and several forms of it are shown. The Canton Steel Roofing Company, of Canton, Ohio, show an extended line of metallic roofings, including Bessemer steel, galvanised steel, American tin plate, and corrugated steel and iron, together with a variety of appliances and applications of these materials to building. The most interesting feature is what is called the "H. W. Smith Patent Folded Lock Standing Seam Steel Roofing," consisting of flat steel plates joined by folding the cleats and edges together, thus forming an interlaced joint of great strength and compactness. The Cortright Metal Roofing Company, of Philadelphia, Pennsylvania, show an assortment of metal tiles and shingles. These are applied in the usual way, the joint being effected by an expansive side lock, one sheet hooking into the other in a manner that prevents them becoming unfastened after being laid. The specialty of this firm is the production of a metal roofing that will simulate clay tiles in appearance.

A small variety of terra-cotta tiles are shown, including collections from several foreign countries. None of these, however, exhibit any special novelty or merit in the manner of application, nor do the quality or shapes offer much variety. Carl Ludowici, of Ludwigshafen-on-the-Rhine, makes a small exhibit in the German section of the Mines and Mining Building of roofing-tiles fitting into each other without needing a board base. The Celadon Terra-Cotta Co., Limited, of Alfred Centre, New York, show various styles of interlocking tiles. Their "interlocking cones" produce a roof of considerable

boldness, and can be applied in a variety of forms with pleasing results. They also make a line of interlocking tiles of different configuration and character, capable of producing a great variety of combination. A cement roofing is shown by John C. Zallee, of St. Louis, Missouri. It consists of an outer layer of cement held in place on a board bottom by flat top hooks, driven into the boards and partly projecting.

One or two American firms send samples of wire lathing, which is so valuable an adjunct in fireproof construction. The largest of these exhibits, and, in some respects, the most interesting, since it is quite full and complete, is that made by the New Jersey Wire Cloth Co., of Trenton, N. J., who manufacture what is known as the "Roebing Standard Wire Lathing." In this lathing the mesh is made rectangular in shape, instead of square, with the advantage, it is claimed, that the special plastering compounds that are now largely used may be employed with it without the loss that ensues from widely-spaced meshes. It is also claimed that it holds the plaster better than ordinary wire lathing, and that a large percentage of saving may be effected in the amount of plaster employed. The exhibit includes walls and ceilings, showing the lathing in practical application.

The Byrkit-Hall Sheathing Lath Co., of Chicago, make the most important exhibit of wood-lathing. Their product consists of boards cut in deep grooves, the boards interlocking in the usual way. It permits an economical form of construction, since the outer surface of the lathing can be used, in a wooden building, as a base for the outer covering, and the inner surface can receive the plaster without other furring.

In constructive glass only one or two exhibits can be mentioned. The American Wire Glass Manufacturing Company, of Philadelphia, exhibit examples of their so-called wire glass, which, as its name implies, consists of a sheet of glass having imbedded in it a sheet of wire netting, which can be made of any size or pattern. Not only is it claimed that a stronger glass than the ordinary sort is produced by this means, but that it lends itself especially to large skylights, since the wire netting sometimes stretched below them to protect passers-by from falling glass may be dispensed with. It is also claimed that this material can be used in place of the ordinary bull's eye pavements, though we believe no actual experiments in this direction have been undertaken.

Henneberg Brothers, Nyon, Switzerland, make an extensive exhibit of Falconnier's Glass Brick, for greenhouses, conservatories, photograph galleries and the like. They show a conservatory built wholly of this material, and a small office, in which the glass bricks of various forms and colours are employed for walls. The bricks are light, and the plain glass, which is chiefly used in six-sided shapes, makes a pleasing and effective material for the special uses to which it is put. A. E. Rendle & Co., of Philadelphia, show a large number of greenhouses constructed by them on their iron and glass system. These form part of the horticultural exhibit, but they also show a section of their patented skylights in the Manufactures Building. Special stress is laid upon their new patent "paradigm" system, in which no wood whatever is used, a steel channel bar being used throughout, wholly protected from the weather by the glass and by small copper caps covering the bolt openings.

The Gardner Sash Balance Company, of Chicago, make a fine exhibit of their window pulleys and sash ribbons. These, as the name implies, consist of steel or aluminium bronze ribbons running over noiseless axle pulleys, in place of the ordinary sash cord. The ribbon will not catch, kink, or get out of order, and presents manifest points of superiority to the ordinary rope cords.

In constructive iron scarcely anything at all is shown, even the large American manu-

facturers being unrepresented. This singular condition of affairs arises, we understand, because the space offered was not deemed sufficiently large for the larger firms to display their products in a satisfactory manner. The most important displays of constructive ironwork on the Fair grounds are, therefore, the trusses and other ironwork of the buildings themselves. The chief points of these very notable constructions have already been noted in previous articles, and need not be rehearsed afresh here. The lack of an adequate display of constructive iron is serious, since this is a feature on which American builders especially pride themselves, and some notable exhibits might naturally have been looked for. In striking contrast to the action of the American iron firms is the exhibit made by the famous German firm of the Gebrüder Stumm, who control the largest ironworks in Germany, next to those of Krupp. Their exhibit is placed in the Mines and Mining Building, and though occupying a relatively small space is very complete and arranged with great taste and care. It comprises a full line of the firm's products, with examples of finished and unworked metal, pipes, I bars and beams, structural shapes, models of works, and sundry other features, all arranged in a rather sensational manner in pyramids, monuments, and other architectural forms. Special mention may be made of two obelisks of I beams and structural shapes, one of steel, the other of iron. An extraordinary number of large bent pieces are shown, all bent cold, and showing the thoroughly homogeneous nature of the material and its great tenacity, and finished in a beautiful manner. Among these mention may be made of a rail 180 ft. long, bent cold into a series of scrolls. The collection of iron pipe is also large and complete, and the whole display is worthy of the warmest praise. It is a curious commentary upon the Exhibition that in a country so rich in iron, and containing so many iron mills and furnaces, on this great occasion the most important display of this national product should be from a country so distant as Germany. It may be added, in passing, that the exhibit of Krupp at the Exhibition far surpasses that of Stumm in extent, but it is chiefly composed of guns and armour-plate, and need not, therefore, be considered in the present connexion.

Although there are no exhibits of American structural iron, there are a variety of elevators shown in the American section. According to the classification these properly belong to the department of Transportation, and the larger part of the machines are housed in that building. But the elevators employed in most of the Exhibition buildings, where they are very necessary, owing to the great height, and the fact that galleries are introduced, and even the roofs occupied by restaurants, or as places from which views of the buildings may be had, are classed as exhibits also, and as they are in practical operation they afford the best possible means of exhibiting their workings. The well-known firm of Otis Brothers & Co., New York, have eight elevators in the centre of the Transportation Building, carrying passengers to the roof; eight in the Administration Building, four in the Manufactures Building, all leading to the roof, and five in the Casino Building. Those in the Transportation Building and the Casino are hydraulic elevators; those in the Manufactures Building electric. In addition they have, in the Transportation Building, an exhibit of elevators, elevator engines, and other apparatus, which may be considered their exhibit proper. This firm now chiefly employs electricity for passenger elevators. They show, among other machines, a Multiple Geared Electric Elevator Engine, a very large and complicated piece of machinery designed especially to attain very high speed. This machine, it is claimed, can run 800 ft. per minute, a swift normal speed being 350 ft.

They also show, in practical operation, attached to an elevator running to the gallery over their exhibit, a "double worm gear electric elevator," the special feature of which is two wheels working into each other, and a double worm, thus preventing loss by friction. Other machines are steam hoisting engines, pumps for hydraulic service, iron platforms for furnaces, mines, and heavy freight service.

Morse, Williams & Co., Philadelphia, show their direct electric elevator. This machine is designed to obtain simplicity of construction and accessibility of parts in repair, and attains a speed as high as 250 ft. per minute. The worm-shaft, to which the motor is attached by a pulley, is provided with a powerful double shoe brake, which is released by the action of an electro-magnet and applied by weight. By this arrangement the brake would be immediately applied were the electric current cut off, and the machine is stopped. The car is provided with a slack cable stop, which acts automatically if the car should become obstructed in descent, and by an arrangement of stop collars and nuts the car is automatically brought to a standstill at terminal landings. An electric elevator is also shown by the Elektron Manufacturing Company, of Springfield, Massachusetts. This machine is one of the newest in America, though the points of difference with older machines are not, perhaps, very marked. General compactness and excellence of workmanship are claimed by the makers. The current only acts when the machine is set in motion, and it is claimed that this system permits a considerable saving in cost, as compared with those machines in which the motor is continuously in motion. The car is supplied with the usual safety devices; the switch and break are operated by the same mechanism, so that when one is off the other is on, and *vice versa*. A special safeguard, introduced in some instances, is a safety hatchway switch, placed just above the upper landing, so that in case the usual automatic stops and breaks refuse to act, the car itself will open this switch and thus stop the motor. In both the Morse and the Elektron elevators the manufacturers supply the elevator and motor complete as a single machine. An elevator shown by the Smith-Hill Foundry and Machine Company, of Quincy, Illinois, can be applied to any electric motor or steam connexion. The distinguishing feature of the hoisting apparatus is a ball-bearing to take up the friction due to the thrust on the worm shaft. The car is supplied with the usual safety apparatus, one of which consists of a toothed wedge under the car connecting with the wires carrying it, and which brings it to a standstill in case of breakage of the wires. This elevator is supplied with the Zeller automatic safety gate, made by the Richmond Safety Gate Company, of Richmond, Indiana, which automatically closes and opens as the elevator rises or descends. This is a very convenient device for freight elevators, but quite unsuited for passenger service. Pneumatic elevators are shown by the Eaton and Prince Company, and the Miles Pneumatic Tube Company, of Boston. Neither of these seem to embrace any special novel feature. Two pneumatic elevators, like the others in actual operation, are shown in the California State Building by the Cabill and Hall Elevator Company, of San Francisco, California. The Crane Elevator Company of Chicago, make a fine display of elevators, machines, cars, and various sorts of hoisting apparatus in Machinery Hall. Their exhibit consists of a good display of their manufactured products, and, in addition, three elevators carrying passengers to the gallery of the Hall, and operated, respectively by electricity, steam, and hydraulic power. In completeness and variety this exhibit is one of the most interesting of its kind in the Exhibition. One or two small exhibits of hoisting apparatus and elevators, designed chiefly for freight service, are also shown in Machinery

Hall, but do not call for special mention. In this connexion reference may be made to the large exhibit of the American Hoist and Derrick Company, of St. Paul, Minnesota, which is placed outside Machinery Hall, and consists of derricks for heavy lifting in exterior work or in building, with the necessary hoisting machinery, all shown in practical operation, and in a very complete manner.

Very little is shown in the way of fire apparatus, fire-escapes, fire-engines, and the like. The Providence Steam and Gas Pipe Company, of Providence, Rhode Island, show the well-known Grinnell Automatic Sprinkler in practical operation. The Chicago Automatic Fire Escape and Manufacturing Company show an automatic apparatus to be used as a fire-escape. It consists of a cable wound upon a wheel, to which one is attached by a rope passed round the waist. The weight of the body is sufficient to start the machine, the rate of speed being controlled by a centrifugal governor. In descending, a steel band or spring is wound up within the wheel, so that as soon as the weight is removed the cable returns automatically to the machine. In the British section, Messer & Thorpe, of London, make a small exhibit of their bucket fire extinguisher, consisting of a cover reservoir containing nests of fire-buckets, telescopically stored in water, and thus constantly ready for use.

The sanitary exhibits are separated into two parts, one of which is placed in the Manufactures and Liberal Arts Building, the other in the Anthropology Building. The basis of this division is not at all clear, exhibits of the same character being found indifferently in one or the other building. Save the United States, no country makes any considerable display in this department. In the American section in the Manufactures and Liberal Arts Building several varieties of bath-tubs are shown. The display made by the Standard Manufacturing Company, of Pittsburg, Pennsylvania, is the largest. They show, among other things, chiefly taken from their ordinary stock of porcelain-lined tubs, a model bath-room, costing nearly 1,000/. The walls and floor are of imported tile, and the bath-tub, foot-bath, sitz-bath, stationary washstand, and water-closet, with their fittings, are of the best workmanship and finely finished. This firm makes a speciality of porcelain-enamelled roll-rim bath-tubs, a considerable variety of which is shown. The Steel Bath Manufacturing Company show a line of tubs constructed with an outer shell of steel and an inside lining of copper. The tub stands on metal feet, and is without any woodwork whatever, save the rim, which is of polished wood. Portable bath-tubs are shown by two firms, the Mosely Folding Bath-Tub Company, of Chicago, and the Day Manufacturing Company, of Detroit, Michigan. Both are similar in idea, and are heated by portable heaters using gas or gasoline. These goods are chiefly for use in country houses, or in small towns without water service, and thus apparently perform a useful function. Some of the tubs show an endeavour to approximate so-called "ornamental" pieces of furniture, some being shown in ornamental cases, others wholly covered with plush, thus resembling a sofa when closed. Anything more preposterous than this in the way of decorative utility it would be impossible to imagine. A very light tub, made of vegetable fibre, is shown by the Oswego Indurated Fibre Company, of Oswego, New York. It differs only from the ordinary tub in the material of which it is made. Several forms of portable heaters or geysers are shown, none of which embraces any especially novel idea. English exhibits in this department being so rare, a small collection of geysers by Ewart & Son, of London, may be mentioned. It has been placed in Machinery Hall.

Porcelain stationary wash tubs are shown by the Stewart Ceramic Company, of New

York. They are of the ordinary type of stationary tub, supplied with a corrugated surface in the inside front as a wash board, and thoroughly well glazed. Similar tubs and sinks are shown by the Albany Stone Company, who make their tubs of albyrene stone—a stone somewhat resembling soapstone. The stone they use can be readily sawed, and perfect accuracy of jointage is claimed. The Kilbourne and Jacobs Manufacturing Company of Columbus, of Ohio, show some wrought steel sinks that have some merits of cleanliness and convenience. The sink is made from a single piece of steel, the bowl and thimble being stamped in one piece from the same plate. A readily applied coupling, connecting with the waste-pipe, is a special feature of these sinks. A very fine exhibit of stationary wash basins and bathroom plumbing fixtures is made by Peck Brothers, of New York. A large space is filled with a considerable variety of stationary wash-basins, all taken from the regular stock of the manufacturers, who thus make a notable display of their ordinary resources. No new features are shown, though one or two minor devices are not without interest. Mention may be made of a portable shower bath included in this exhibit, finished in nickel-plated pipes and including all the appointments of luxurious shower bathing that is sold at 130/. They also show a triple jet water-closet, designed to accomplish a thorough washing out of the basin.

The Sanitas Manufacturing Company, of Boston, Massachusetts, show a full line of their Sanitas apparatus, chiefly water-closets. The distinguishing feature of this is the trap. The principle of its construction is simple enough. It may be illustrated by a simple pot-trap turned on its side instead of placed upright, and with a reduced body, but still permitting the air to pass above the water without driving it before it. In the final form half of the body is bent back, the joining edges of the bent back surface being made a single reflecting partition. Absolute antisiphoning is claimed for this apparatus, which can further be used without ventilation, though it may be used with special trap ventilation if desired. In the water-closet the water from the cistern enters below the water standing in the bowl, an arrangement, it is claimed, which greatly reduces the noise of the falling water. On this point the apparatus is far from satisfactory, there being no less noise than may be noted in many other forms of cistern closets. One feature of this display that calls for special commendation is the section of the water-closet faced with glass, permitting the action of the water in the bowl and trap to be fully seen.

Norton Brothers, of Chicago, show the "Norton Hermetic Seal Noiseless Sanitary Fixture." This is a new form of water-closet, and embraces several points of special interest. The "hermetic seal" which is the distinguishing feature of this apparatus, is a bronze valve, controlling the influx of water and the outlet to the sewer. It is placed below the bowl and above an ordinary ventilated trap, and entirely disconnects the sewer and water supply when not in use, both being simultaneously opened and closed by means of a lever. The valve is the only moving part of the apparatus. At present the apparatus is heavy and costly, but increased use will doubtless result in a diminution of the price. It is entirely noiseless, and in this respect fully supports the claims made for it by its makers. No water, however, is ever in the bowl save for flushing purposes, an arrangement which seems to us very objectionable indeed.

A miscellaneous collection of sanitary apparatus is housed in the Anthropological Building. Several American firms show lines of filters constructed on the pressure or the gravity system, several showing filters of both kinds. The differences in these seem to be more differences of detail than of principle, and as none of them offer anything novel in form or in idea, they

may be passed by without special description. The single exception to this general similarity is the Pasteur filter, in which the filtering medium is made of a specially prepared composition, which is the distinguishing feature of this apparatus. There is little that is interesting shown in ventilation. Ventilating fans of the ordinary type are shown by one or two firms. A small window ventilating apparatus is shown by James F. Almy, of Salem, Massachusetts, consisting of a cylinder, part of wood, part of wire gauze, placed in a shallow box which can be fastened to any window. By turning the cylinder, air is admitted or shut out. B. S. Benson, of Baltimore, Maryland, shows an apparatus for purifying air that clearly requires more extended confirmation than its patentee appears at present able to give it. Air is taken in by a tube from the outside and passed through a series of antiseptic sieves, arranged in a closet-like stand. At the top it passes over a chamber heated by a lamp, and thence by pipes which cool it to an orifice just above the head of the patient lying in bed. The Automatic Fountain and Disinfecting Co., of Canton, Ohio, show their Botsford automatic fountain for holding disinfectant, fluids, and which, they announce, is employed to disinfect the public water-closets upon the Fair grounds. As the ventilation of the rooms in which these closets are placed is extremely bad, windows even being kept closed for no apparent reason at all, and as the odours from them are very strong and unpleasant, the value of this statement to its makers is scarcely apparent.

Of general sanitary apparatus the most extended display is made by Capt. M. P. Nadein, of St. Petersburg, Russia, who shows a large model of his system of sanitary drainage. This apparatus is too complicated to be described in a few words, and it is therefore sufficient to state that it has been constructed with the idea of utilising the human wastes for manure purposes, or reducing the solid wastes to such a form as will permit them to be burned in a domestic stove without offence. Geneste, Herscher, et Cie, of Paris, show two movable disinfectant apparatus, with models of other sanitary appliances, and some fine detailed drawings illustrating methods of ventilation, and the like.

Several models of quarantine stations are shown. Canada sends a very good model of the furnaces of the quarantine station at Grosse Isle, Quebec. Japan sends a beautifully-executed model of the Imperial Quarantine Station at Shimonoseki, Japan, showing the disinfecting furnaces, hospitals, &c. Equally fine is the model of the system of maritime sanitation employed by the State of Louisiana at its Mississippi River Station, and exhibited by the Board of Health of that State. The station was devised to disinfect not only the bedding of any vessel and the clothing of its crew and passengers, but to accomplish the purification of the vessel itself. For this latter purpose the ship is first fumigated by sulphur furnaces placed in the hold and cabins; the floors, walls, and ceilings are then washed with a solution composed of 1 part bichloride of mercury, 2 parts hydrochloric acid, and 800 parts water; all water ballast and bilge water is removed, and any hard ballast, finally, disinfected. The model fully explains the methods employed in this work, as well as the apparatus for disinfecting movable articles. In the same line, mention may be made of a model of a United States Government marine hospital shown in the United States Government Building.

Model buildings and homes for working-men are not very well represented at Chicago, though several foreign countries send models and drawings. But these are scattered through the buildings, and are hard to find and difficult of access, and a systematic study of their several points of merit is scarcely to be undertaken. New York State has erected a model of a working-man's home upon the Fair grounds. This is de-

signed for country towns and villages where land is plentiful, for though small it is not at all suited for city purposes. The dwelling is of wood, and contains a living-room, kitchen, and bath-room on the first floor, with three bedrooms above. Though compactly planned, the rooms are sufficiently large, and the hall space ample. More interesting, because an actual example of a city dwelling, is the Philadelphia working-man's home, built in the Midway Plaisance. This is a small two-story brick dwelling of the type characteristic of Philadelphia, where the great majority of working-men live in individual homes, and where the tenement is almost unknown. Unfortunately, this building was closed each time we visited it, but it doubtless included, as a type of its class should include, a living room and kitchen below, with two bedrooms and bath above. A model apartment house is shown by E. T. Potter in a small scale model. In this structure light and air at the sides is obtained by recessing the walls, and by building them in obtuse angles of which one side is larger than the other. By this arrangement each family has a vestibule, parlour, one or two bedrooms, kitchen, private lift, coal-cellar, and the like, with six families on each floor. A model of the Riverside Dwellings of Brooklyn, New York, is more interesting. These tenement houses have come to be looked upon as the model structures of their class in America. They are strictly fireproof, being built of brick. Each apartment has its own entrance on the main floor, those of the upper floor opening on to a common stairway. Iron balconies on the front permit further communication between different apartments without the need of dark halls, and at the same time act as fire-escapes.

It is impossible to conclude this brief notice of building materials and sanitation at the Columbian Exhibition without reference to the models of structures of all kinds scattered throughout the Exhibition buildings and grounds. Some of these are in the shape of exhibits of manufacturing firms; others are properly illustrations of works of engineering, but taken first and last the number of these models is very considerable, and if gathered into one place would make a most interesting exhibit of modern utilitarian edifices, though perhaps not of those generally connected with architectural art. Another important group of structures is the models of primitive architecture, sent by various foreign countries, or used as illustrative of the customs and resources of American Indian tribes. The Exhibition includes a large number of these models, most of them being located in the Anthropological building. Many of these, as notably some villages from British Columbia, have been made with the greatest care, and represent the actual structures with great clearness and accuracy. Several actual Indian dwellings are also included in the Anthropological display, and some models of ruins in Yucatan, erected in the open air, deserve mention. Besides these, mention might be made of several native villages in that strange medley of shops, shows, and people known as the Midway Plaisance. These are intended to illustrate the lives and manners of various primitive peoples. The Samoan and Java villages, both of which have been built with great care, are the most interesting of the series, and most ably illustrate, with the people who inhabit them, the life of the people they represent.

NOTES.



HE meeting convened by the Mayor of Sheffield may or may not lead to a settlement of the coal crisis, but in any event it marks a most important epoch in the struggle. The mayor himself speaks most hopefully, and we trust that he may not be disappointed; but a meeting at which a burning question could be discussed at great length "in a very friendly and kindly spirit,

without the introduction of a jarring word," cannot possibly be described as wholly unsuccessful. The compromise submitted for the consideration of the disputants is, perhaps, as fair a one as could have been suggested, involving, as it does, some sacrifice on both sides; and it remains to be seen to what extent either or both sides are prepared to gracefully give way on the lines laid down. Opinion varies as to the probabilities in different districts, but it is at least certain that the masters will abandon the 25 per cent. demand. The suggestion is that work be resumed at once at the old rates, and that the miners submit to a reduction of 10 out of the 40 per cent. advance obtained since 1888 in six weeks' time. Now, granting that the wages on which they managed to exist prior to 1888 were quite inadequate, can it be argued that 30 per cent. above that figure is not a "living wage"? If fortune, or a brief period of brisk trade, had favoured them with 50 or 60 per cent. advance, we suppose that we should have been told that the historic 40 per cent. was not a living wage. The men ought to learn from the events of the past few weeks that neither they nor their leaders are infallible in their conclusions as to what is the best policy. This was clearly proved by their change of front concerning the resumption of work question. They threw away thousands of pounds in wages before they would admit their error, eventually accepting precisely the same terms as were originally offered. It is high time for them to reflect whether their other watchwords, "no arbitration" and "no reduction whatever," may not possibly be fallacious. Another lesson which this "industrial reign of terror," as the situation is not inaptly described, should teach, is that it will inevitably turn attention to substitutes for coal as fuel, and expedite the coming period when coal will be less in demand than it is at present. This is a consideration which should weigh equally with masters and men, for, large as our coal trade is, it is not sufficient to keep our collieries going more than three or four days a week for the greater part of the year.

SIR JOHN HARWOOD announced last week that on January 1 next vessels would be free to traverse the whole length of the Ship Canal from the Mersey to the Manchester Docks. A reference to the company's prospectus dated July 20, 1886 shows that it was anticipated that the whole of the works would be completed within four years from their commencement; but it soon became apparent that both time and cost were woefully underestimated. It now remains to be seen how far the directors' estimates as to receipts will prove to be accurate. The near approach of the time when the canal will be in full working order will doubtless cause its competitors to bestir themselves, and the trading public, at least, may look for some advantage from the completion of the long-delayed work. As soon as the Canal Bill was passed in 1885 the railway companies reduced the carriage of bale goods from Manchester to Liverpool 29 per cent., and it is certain that no trade will be transferred to the canal that can be retained by rivals.

MR. RUSSELL ENDEAN'S first letter to the *Times* about the Shaftesbury fountain was absurd enough, but in his second he has surpassed himself. He boasts that no eminent members of the Royal Academy have come forward to defend Mr. Gilbert's work. It does not seem to have occurred to him that possibly they would think they were paying him far too great a compliment in replying to his scolding. Also, notes Mr. Endean triumphantly, "the artist is silent." Just so. In effect, Mr. Endean runs after a very gifted artist and assails him with abuse and contempt in the public streets, tells him his work is an offence against good taste, and so on; and when the artist takes no notice of

these insults, Mr. Endeau turns round to the mob and says "There, I told you so! You see he has nothing to say for himself!" It would be difficult to beat that, for sheer impudence, even in the annals of British Philistinism. We observe that Mr. Beachcroft, in the County Council, moved that the fountain should be removed and re-erected somewhere else, and one more worthy of the object erected on the present situation. We fear that nothing that will please artists will satisfy critics of this class. On the other hand it is to be regretted that Mr. Gilbert has to a certain extent laid himself open to the complaint of having evaded the main point of his commission. He was commissioned to design a memorial fountain to Lord Shaftesbury, and he seems to have dismissed Lord Shaftesbury entirely from his mind, and merely endeavoured to make a beautiful fountain. If there had been some attempt to symbolise, in an ideal manner, the character and work of Lord Shaftesbury, the fountain might have been just as beautiful, and the blockheads would have been deprived of a certain semblance of reason in their complaints, which it is a pity they should have. It is giving an advantage to the enemy. We are glad to find that, at all events, Mr. Gilbert's objection as to the injury done to his design by the fence wall round it is to be attended to, and the wall lowered to a curb. As it is, it obstructs the view of what is quite the best designed portion of what may be called the architectural detail of the fountain.

IN regard to our remarks (page 240 *ante*) about the objections raised to the change of the name of Great and Little Queen-street, Westminster, into Atterbury-street, an eminent engineer who has had his office in that street for many years, puts his side of the case to us as follows:—

"I have been in this street more than twenty-two years—seventeen years at No. — and more than five years at my present number — and notwithstanding that lapse of time I still have letters addressed to me at the old number. You must remember that there is a good deal of small literature of mine about the world—papers read before different societies—and these mostly have my address on them. Now in five or even ten years' time anybody abroad wishing to write to me will probably get my address from one of these papers, and I want to know where that letter will go to if this street has ceased to have an existence for that number of years. The chances are I shall never get it. It is not a change of address for me, but the absolute wiping off the face of the earth of an address with which I have been connected for nearly a quarter-of-a-century. It would have been better for me five years ago to have moved to an entirely different street, or even neighbourhood, instead of securing a twenty-one years' lease of this house, and for which I paid pretty dearly with the sole object of practically keeping the same address at which I had been known for seventeen years."

Of course we recognise that this is a cause of inconvenience, or at least of anxiety, to a professional man; and we may admit also that there is something to be said for the fact that Great Queen-street had acquired a kind of proverbial repute as an engineers' neighbourhood, and perhaps the County Council would have caused less inconvenience had they altered the names of the streets in the Drury-lane neighbourhood instead of such an exceedingly professional street as that at Westminster. We have no doubt, however, that dwellers in Great and Little Queen streets, Drury-lane, would have made the same outcry; and among them we may mention that the large printing establishment at which this journal (among others) is printed, has occupied its situation in Great Queen-street, Drury-lane, for a great deal longer than our engineering correspondent's "quarter of a century," and would have perhaps a better right to complain; and there are several very old established shops in the same street, besides the historic Freemasons' Tavern. Are people in trade less injured by a change in their old-established address than professional men? Perhaps so, as they are able to advertise their change of address in ways which a professional man could hardly

employ. At all events, it is manifestly absurd that there should be a Great and Little Queen-street, immediately contiguous, in two different quarters of the town, and the County Council is quite right in doing away with one of them. The only question is, which should be altered; and perhaps the only thing certain about that is that, whichever is renamed, the inhabitants of that street will say that it ought to have been the other. This is human nature, but there is rather a want of public spirit in it.

THE report of the Hellenic Society mentions, among other points, that special attention has been paid by the Council during the past year to the development of the library. Various purchases of books of some value have been made, and an opportunity has been taken of placing the books in a room more suitable and convenient for their use than that in which they have hitherto been kept. The report gives a very good account of the state of the British School at Athens, which has naturally gained a good deal of additional credit of late by the results of the excavations at Megalopolis. With the Hellenic Society's report is circulated an appeal for aid from the Asia Minor Exploration Fund. The interest and importance of the work proposed to be undertaken, if funds can be raised, cannot be better stated than by quoting from the report the brief statement of the objects in view:—

"I. It is proposed to continue and complete the work of the past ten years by a thorough investigation of districts yet unexplored, and by a re-examination of others—such as Phrygia.

(a.) Of the unexplored field the most important part is the upper valley of the Euphrates, where we may hope to find not only very early monuments, but also remains of the Roman frontier defences, lining the right bank of the river. Eastern Cappadocia must also be thoroughly explored, and the remains of all periods found there carefully photographed and recorded. Towards this part of the work the Royal Geographical Society has already made a liberal contribution.

(b.) A re-examination of such districts as Phrygia is necessary to enable Prof. Ramsay to complete the comprehensive work which he has in preparation on the 'Inland Provinces of Asia Minor.'

II. In addition, it is proposed, for the first time, to attempt excavation. It must be remembered that, with the exception of a few sites on the western coast, Asia Minor is still virgin soil, undisturbed by the excavator's spade."

A sum of 2,000*l.* is mentioned as necessary to carry out (we should say rather to commence) this scheme. It is to be hoped it will be obtained. In some countries a Government grant would be given for such an object; but of course that is hopeless in England.

PROFESSOR POOLE has been fortunate in securing the services of Professor Percy Gardner for a course of lectures on Greek sculpture this term at University College. Professor Gardner is well and widely known for his sound and cautious interpretation of monuments, and if students want to learn what is known rather than what is imagined about Greek art they cannot do better than attend the course. The period chosen is from Pheidias to Lysippus, and the first lecture is given on Thursday, October 19, at 5 p.m. The fourth lecture we note is devoted to the school of Polycleitos, and includes, of course, the recent excavations at the Heraion, near Argos. The lecturer will no doubt have something to say on the vexed question of the date of the newly-found head of Hera.

ARCHITECTURE has been poorly represented at the Berlin *Salon* this year. The only Berlin architect of repute represented was Herr Heinrich Seeling, who showed some competition drawings for the proposed Berlin Provincial Museum, to which we have before referred, some drawings of a new theatre he has erected at Plauen, and some photographs of the "New Theatre" at Berlin, to which we have also alluded in a

former number. Saxony was represented by Messrs. Schilling & Graebner, of Dresden, who contributed some photographs of a Renaissance church, a town hall, and two villas. Herr Heim, of Berlin, exhibited drawings of two hotels, and Herr Tiede sent an elevation of his design for the Darmstadt Museum. There was strong evidence of the fashion of church building which has shown itself throughout Germany of late, though the various contributions of church architecture were not of very striking merit. Of the usual contingent of competition and other designs for memorial monuments to Emperor William, we only saw, this time, an interesting one by Herr Filler for the Berlin "Schlossplatz," and one by Herr Halmhuber for Coblenz. The Dresden architects alone received an "honourable mention" from the hands of the Managing Committee. If the proposed special Architectural Exhibitions of the "Vereinigung Berliner Architekten" really take place next year, the usual architectural room of the annual *Salon* will, probably, be put at the disposal of another art.

THE death of Mr. Ford Madox Brown removes from among us an artist of rare elevation of mind and singleness of aim, and of talents which were nearly allied to genius. He was one of those artists who care for their work more than for its emoluments, and who spared no pains towards rendering his pictures all that he desired them to be. For many years he had been quietly and unobtrusively labouring at his great work, the decoration of Manchester Town Hall; so unobtrusively, that his existence was almost forgotten by many people who profess to be interested in contemporary art, till they were reminded of him every now and then by the exhibition of a new cartoon for the Manchester series. But while one must look on his career with the greatest respect and on his work with the greatest interest, there seem to have been certain bounds set which he did not pass. His paintings produce the impression of having been contrived, set out, and completed, with the most conscientious care and thought; but one seems always conscious of the effort in their construction. The first work which made a reputation for the artist may be said to have been almost essentially a moral painting; the one entitled "Work," with some labourers at work in a street and portraits of Carlyle and F. D. Maurice looking on. The picture was painted with the great force and conscientious labour of the old "pre-Raphaelite" set, but it must be admitted that it was about as ugly a picture, in a pictorial sense, as one could see. The painter emerged afterwards, like others of his set, from that extreme manner, but it seems to us that the moral element in him always kept rather the upper hand of the pictorial instinct.

NOTWITHSTANDING the great promises that were made in regard to the Photographic Society's exhibition of this year (now open at the gallery of the Society of Water-colours), which was to illustrate the artistic element in photography, and prove that it was something more than a mechanical or chemical craft, we do not see that the present exhibition in any way surpasses its predecessors in this respect, if indeed it is equal to some of them. As to the artistic element, there is nothing in this exhibition equal in this sense to the portrait groups which Mrs. Cameron produced long ago—at least not in the way of figure-subjects. In landscape the Autotype Company exhibit a "carbon enlargement" from a photograph by Mr. P. H. Emerson, "The Wherry" (33), which we take to be a view on the Wensum at Norwich, which is a remarkable example of almost pictorial effect produced by photography; and, considering it as a monochrome picture, we do not know whether a water-colour artist

could do much more with the scene in a monochrome study. The element of figures is only very subordinate, however, in the scene, and the whole effect is to some extent owing to a mistiness of treatment which allows us to escape the hardness of detail characteristic of photography. A couple of very small scenes photographed by Mr. Wadsworth (21, 22), labelled as "cold bath platinum" photographs, have something of the softness and tenderness of pencil studies. Mr. W. A. Cadby has succeeded in making two pretty nearly nude studies of a child, seated draped in transparent lace (12 and 13); and in No. 18 he has induced his young sitter to assume a really pretty attitude for a kind of classic fancy, a girl—child with a mirror. Generally speaking, the introduction of the figure into a photograph scene at once breaks the spell (or what there is of it), and shows us how much we owe to painters. Look at "A Conquest," for instance (97), supposed to be a love idyll in a shady lane, and see how common and ill-posed the figures look compared with what we should find in a similar scene by Mr. Thorne Waite, Mr. Tom Lloyd, Mr. Norman Tayler, Mrs. Allingham, and others we might name. Even the figure studies by Count von Glöden (213-23) seem to prove that half the beauty of the nude figure, after all, rests with the painter; who of course seldom gets, any more than the photographer, the chance to copy the most refined types of natural beauty. The group (218), apparently Italian youths, shows one or two really graceful figures; and of course as studies for artists these figures are useful, but few indeed of them are beautiful. The difference between photography and art is strikingly illustrated again in the photograph of a laughing young woman on a swing (260), under the title "When the heart is young"; a painter could have made this pretty; here it is only vulgar. Our eye was caught by one example which we turned to look at again, as apparently an exceptionally successful sea photograph; it turned out to be not from nature, but from one of Mr. Henry Moore's pictures! Architecture has received a little more attention than usual; Mr. Henry Little sends large photographs of St. Paolo fuori le Mura (328) and the ceiling from the same church (325), and there are one or two other examples, but nothing compared with what such an exhibition ought to show in architecture, the class of subject in which photography is more successful than in any other. The vulgarity of some of the figure group-scenes exhibited is remarkable—more so even than usual.

IN our Foreign Notes last week (France) we had to record the destruction by fire of the church at Quillebœuf, in Eure (Normandy). The church stands close by the lighthouse, on the estuary (left bank) of the Seine, of which the navigation at this part is difficult, and at times dangerous. The church of Notre Dame du Bon-Port has a tower with a pyramidal roof, and nave with seven bays, of the eleventh century. The nave windows were restored about twenty-five years ago. The choir is said to have been built *temp.* Henry IV., on whose behalf Bellegarde defended the town against Villars and Mayenne. Its windows were filled with some fine glass, one representing a procession, in contemporary costume, of the Brotherhood of Charity. But the chief feature of the church was its porch, in the Romanesque style, which ranked amongst the leading architectural beauties of the country. It is thus described in P. Larousse's "Grande Dictionnaire Universel du XIX^e Siècle."

Le portail, classé au nombre des monuments historiques, est surtout intéressant. Entre les deux contre-forts qui correspondent aux arcades intérieures de la nef, il est percé de deux fenêtres romanes et d'une porte du même style, ornée d'une cannelure, d'un double rang de zigzags qui se joignent à l'extrémité de leurs angles, et d'un bourellet au-dessus duquel il s'en trouve un second qui se termine par deux têtes après avoir décrit un demi-cercle. Des

losanges ont été sculptés sur la plupart des petites pierres carrées dont le portail est construit.

Quillebœuf, the old capital of Roumois, was given by William Longue - Epée to the neighbouring abbey of Jumièges—a heliographic print of whose ruins will be found in a current work, "La Normandie Monumentale et Pittoresque." Havre, 1891, fo. Henry IV. employed Dufaie to fortify the town, which he meant to name Henriqueville, and gave a charter to its pilots, who form a corporation like that of the pilots at Dover and Deal. After his death Marie de Medicis ordered the works to be destroyed. Views of the port and its interesting church are given in a folio volume published at Paris, 1835, for Bonnington and his fellow authors of "Excursions in Normandy."

IT is stated, that Travers College, Windsor, has been converted into a choir school for St. George's Chapel, and that the choristers will shortly vacate their present quarters near the Horse-shoe Cloisters. The Naval Knights, abolished by a recent Act of Parliament, were established to consist of seven superannuated or disabled Lieutenants of the Royal Navy, under the will, proved in November, 1725, of Samuel Travers, Supervisor (or Surveyor-General) to William III. and Anne. After bequeathing a sum for the erection of an equestrian statue to William III. in St. James's-square, or on the Cheapside conduit, he set aside an estate of 500*l.* per annum for the Lieutenants, who were to be enrolled with the eighteen Poor, since named Military, Knights of Windsor. Owing to various suits in Chancery, letters patent for the foundation were not issued until June, 1798. In 1801-2 the buildings were erected in Datchet-road, at a cost of nearly 9,000*l.* The conditions under which the beneficiaries were required to live together were of a kind unsuitable at this day, but in one case—that of Lieutenant Holman, the blind traveller—the rules were relaxed, and he was allowed to go abroad. The pedestal for the statue was erected in 1732, but the statue itself, by the younger Bacon, was not set up until 1808.

IT seems somewhat probable that the painters' and decorators' trade will follow the example of the plumbers and endeavour to establish special education, registration, and a certifying examination. The "Painters' Company," whilst not financially in a position to contribute funds, is rendering material aid to the thorough discussion of the subject, not only by lending their old Hall for conferences and committee meetings, and as a centre for correspondence, but by appointing members of the court to serve on the committees held in connexion with the subject. The movement has originated in a strong feeling on the part of some of the workmen that there are a large number of almost entirely untrained men engaged, every season, on painters' work. A committee, formed at a recent conference held in the Painters' Hall, has issued to all the principal employers of painters a circular containing the following questions, to which answers are requested:—

1. Is there a masters' organisation in the town?
2. Is there an organisation amongst the men?
3. Have you any technical or educational institute in connexion with which the scheme could be worked?
4. Failing this, would the employers of the town, in conjunction with the men, organise a class, and try and promote the object we have in view?
5. If you have an organisation, would you kindly ascertain the opinion of the members on the above subjects, and furnish the committee with the result as soon as possible.
6. In the absence of any society would you consult with other employers and leading workmen, to endeavour to arrive at a decision?

Will you kindly reply to the above questions, and indicate on the margin opposite the proposed schemes any suggestions you have to make regarding them.

This circular is sent with the intention of ascertaining how far there is a real demand for either of the proposed objects, since any

large scheme of the kind could only succeed if it secured a considerable measure of confidence and support from both masters and men.

OUR illustrations this week include a geometrical detail drawing of the large bay-window of the Colchester Library, a view of which forms one of the smaller illustrations. We cannot but wish that architects of larger buildings would be willing occasionally to follow Mr. Binyon's example, and give us tracings of the constructional detail drawings of important portions of a building. Nothing can be more valuable as illustrations in an architectural journal than drawings of that kind; we would gladly give them often; but of course we are entirely dependent for such drawings on the kindness and goodwill of the architect of the building illustrated.

ARCHITECTS' CHARGES.

WITH the consent of both parties we are enabled to publish the following letters between Mr. Edwin T. Hall, F.R.I.B.A., and the Lord Chief Justice of England:—

57, Moorgate-street, London, E.C.

August 9, 1893.

To the Lord Chief Justice of England.

MY LORD,

Re Architects' Charges.

I am sure the vast majority of architects desire not only to avoid disputes with their clients, but still more to avoid even the suspicion of making inequitable charges for services rendered.

The general principles enunciated from time to time by your lordship in regard to architectural charges, reaffirmed in the recent judgment in *Farthing v. Tomkins*, naturally place all such architects, of whom I have the honour to be one, in a dilemma. May I venture to ask your patient consideration of the following statement:—(a) The thinking out of a design, *i.e.*, the application to the problem set by the employer of the architect's creative faculty developed by study, training, and experience. The first expression or result of this design is the preliminary sketch. (b) The maturing of the design by most careful study of every detail, not only of artistic expression, but of convenience of arrangement, providing adequate light and ventilation for all parts of the building, the scientific construction for stability, the drainage, heating, lighting, &c. This is expressed by the working-drawings, and specification, and, as doubtless your lordship knows, working-drawings not only comprise general plans, sections, and elevations of a building, but drawings to a large scale of many parts, and full-sized drawings of every moulding, of the brickwork and masonry, of all skirtings, architraves, door and wall panels, staircase (newels, balusters, strings), plaster and wooden cornices, &c., &c., while the specification is a mass of detail. (c) The necessary explanation of all these to the quantity surveyor, and to the competing builders so as to obtain estimates. (d) The general superintendence of the building while in progress, giving directions to clerk of works, builder, and specialists of all kinds, and the certifying of payments. Incidental to all these are constant interviews and correspondence with the client.

I think, where no special arrangement exists, that a charge of 5 per cent. on cost for all these services, small or great, and for special works, may be assumed to be modest, fair, and reasonable, from the fact that it is accepted by a larger percentage of clients than that of people who adopt a generally accepted view on almost any subject, and your lordship has judiciously given effect to this view.

Considering the many thousands of works carried out, I think your lordship will recognise that the disputes on charges which come before the Courts are very few.

If, therefore, 5 per cent. be reasonable for all the services enumerated, it may with fairness be affirmed that the more important of the functions of an architect are embraced under the divisions *a*, *b*, and *c*; for, given the completeness of the work therein comprised, it is evident that the supervision of the execution will require less close application and attention on the part of the architect. Further than that, the actual outlay by the architect in the payment of staff, &c., is almost exclusively confined within the headings *a*, *b*, and *c*. It is not, therefore, illogical to allocate two-fifths of the remuneration to division *d*, leaving three-fifths for the earlier divisions, and that is a general practice which is

broadly admitted by the great body of clients to be reasonable and fair, as evidenced by the rare occasions on which it is questioned. Indeed, I think in many cases when it is questioned the real reason is that the client who has abandoned a scheme is annoyed that he has, so to speak, to throw away money on services no longer of value to him. I would, with submission, suggest that the translation of the architect's design from the abstract or pictorial building into the concrete or material cannot in equity affect the value of the services rendered previously to reaching the stage of translation; nay, it is possible that an architect's services may be dispensed with previously to that stage, and the building be carried out without his supervision. This is certainly sometimes done when the building has to be executed abroad, a long distance from London, where the work may have been designed. In either case the services for the stages *a*, *b*, and *c* are complete, and if the basis of charge for the whole of the four stages, *a*, *b*, *c*, and *d*, be a percentage, then with equal equity that for the first three stages may be a percentage, or, in other words, may be treated as a fixed proportion of the whole.

There are, of course, exceptional cases where a percentage charge cannot be made with justice to the architect. To cite only one, for example, say an alteration where the outlay may be little, but the ingenuity of the architect may be great to compass the desired end, and the supervision may be relatively excessive.

In this relation it is pertinent to note the recent case of *Watson v. Lewis*, tried before an Official Referee, judgment given for the full amount of the architect's claim, and on appeal this judgment was upheld. In this case the charges (often for work not carried out) were largely in excess of any that an ordinary charge by percentage would cover.

Discarding exceptional cases, it must be manifestly to the interest of client and architect to know approximately what the total remuneration payable is to be, whether the works are carried out or are designed, but subsequently abandoned for the convenience of the client. If no general scale is adopted, the alternative for the rank and file has been suggested of charging according to time employed. In that case, the man of more ready creative faculty, and possessing more ability, resulting from wide experience, who is able to grasp his subject at once, and get through his work quicker, would be entitled to receive less remuneration than the man who is of slower apprehension and less experience, but who, by the patient devotion of more time, may, for the sake of argument, produce the same result. Injustice is done, either in the former case to the architect, or, in the latter, to the client, whereas—the result being the same—a uniform remuneration in either case is, at all events, not unjust to the client.

Again a difficulty would arise as to remuneration if one architect did all the work with his own hands while another had draughtsmen to do the more mechanical work. The late Mr. G. E. Street, R.A., said he made every drawing for a very large building with his own hand. If so, judged by the standard of his position, his time was entitled to a high rate of remuneration, but, as much of the mechanical drawing could perhaps have been done equally well for practical purposes by paid assistants, the client would have suffered had he been charged on the basis of time occupied by the architect priced at its legitimate value, whereas by a percentage charge no injustice would have arisen.

Another question also comes in. Who is to fix the value of the architect's or his assistant's time? It is also possible to conceive that disputes could easily arise as to whether or not an architect had spent an excessive amount of time on any given work. This alone opens up a wide vista of litigation.

A further difficulty arises if time occupied is a basis for charge as to how the architect is to charge for the sometime long period of incubation which goes on in his mind by day and often by night, rendered sleepless by the difficulty of the problem. I am sure it is the experience of almost all architects that on important work this incubation runs through all one's time for days or weeks until at last the design begins to take shape in the brain and is then transmitted to paper. It is practically impossible to say how much time is thus daily solely occupied on any given work, for the thread is running through all other work and occupation.

The fact is that payment by time occupied in drawing falls as a basis, because it does not and cannot take into account that which is due to the higher creative faculties of the artist antecedently brought into play. It is for the benefit of these that the architect is employed.

It is sometimes said that the payment by percentage tends to make an architect spend more money than he would do otherwise. I do not believe the allegation to be true of any appreciable percentage of architects—first, because I believe architects as a class are honourable men; and, secondly, because nothing is more inimical to an architect's interest than to get known as an extravagant man. If he satisfies a client he may fairly expect that the client will both commend and recommend him. He then gains a friend, and his *clientèle* is increased. The policy, therefore, of uselessly expending a lot of money to gain a small extra remuneration on one work would be so foolish that none but the shortest-

sighted man would adopt it; and a man possessed of such a defect as shortsightedness would hardly be likely to succeed in his profession of architect, which eminently requires a man to look ahead.

If the result of charging by time be so variable and, as above shown, be unsound in principle, and if the basis of a proportionate charge be discarded, there appears to be no other way open than to bring each individual case to the arbitration of a learned judge (as in the case cited) or of some other able expert. But it appears to me that such a method of settling the ordinary transactions of life is contrary to the universal principle of barter, is impracticable, and imposes too great a tax to make it a course which your lordship's views of justice and common sense would commend.

I have no authority to speak for or on behalf of the Royal Institute of British Architects, but it may remove a misapprehension if I state that the scale (*i.e.*, the *rate*) of charges was not created by the Royal Institute. Great pains were taken by that body to ascertain what the usual practice was as to charges, and the printed form merely crystallises and codifies the undoubted facts so ascertained. It is not improbable that the percentage system was by general consent adopted because the large body of merchants, brokers, and others who form the bulk of employers were so familiar with that system in their regular business.

I think it may fairly be contended that it was well within the province of the chartered body of architects, not only to ascertain the facts, but to publish the result for the information not only of its members, but of all whom it might concern. The Institute does not impose its scale, even on its own members. The most that it does is to urge the desirability in the interests of employers and architects of following the *usual* scale (where no special agreement is made) so as (*a*) to prevent the pernicious habit of underbidding, which must lead to unscrupulous curtailment of the services properly due to the client, and (*b*) to ensure uniformity of practice; and this is a principle sanctioned by the legislature in the remuneration of solicitors.

It shows but the loyalty of architects to the principle of just and equal treatment of clients that in cases where a basis of payment has not been explicitly agreed, and where an individual may have views legitimately differing in his favour from the recorded general practice, he is willing to waive his own opinion and to base his charges on those in the printed document. This is not always to his interest, for the scale sometimes gives a remuneration equal to that payable to a junior clerk, while on the average, even architects who have good practices only enjoy a modest competence, and the number of them of the widest practice who reap large incomes may almost be counted on the fingers, and is certainly far less than that in either the legal or medical professions.

I trust that in the foregoing I have been able to show that the balance of convenience to client and architect alike is in favour of the practice of proportional charging, and if I have, I trust your lordship may acknowledge that there is both wisdom and equity in the system, whether it be applied to buildings erected or to buildings only designed.

Apologising for the length of this letter, I have the honour to be,—Yours truly,

(Signed) EDWIN T. HALL.

Judges' Lodging, Leeds,

August 21, 1893.

DEAR SIR,—I thank you for your long and elaborate paper on the subject of architects' charges which I have received here this morning. You will not expect me to do more than say that it has received, as it deserves, a very careful and attentive perusal.

I cannot pretend to enter into a full discussion of the subject with you; but I will repeat what I have already said, that I have never doubted the honour and integrity of architects, amongst whom I have the pleasure of numbering some of my oldest and most valued personal friends.

I have the honour to be,

Your Faithful Servant,

(Signed) COLERIDGE.

EDWIN T. HALL, Esq.

REFUSE DESTROYER, WEST DERBY, LANCASHIRE.—The refuse destructor which has been erected in Rathbone-road, Old Swan, for the requirements of the West Derby Local Board district was opened on Tuesday. The site has an area of over 8,000 yards, and is at a height of 200 ft. above the ordnance datum, and is at the highest part of the Local Board's district. The destructor is of the kind known as Fryer's patent, and is provided with Jones's patent fume cremator. It consists of six cells, but provision has been made for the erection of six additional cells when the increase of population renders this course necessary. The flues from the cells are connected with a chimney shaft 160 ft. high, and with an internal diameter of 5 ft. 6 in. The chimney has a square base and octagonal shaft. The whole of the works have been carried out by Messrs. Manlove, Alliott, & Co., Limited, of Nottingham, sole contractors, and in accordance with plans prepared by Mr. Frederick C. Everett, C.E., the Engineer to the Board. The destructor cost 6,000l.

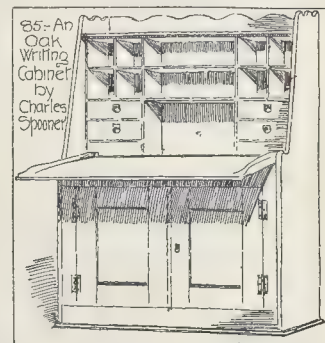
ARCHITECTURAL SOCIETIES.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The inaugural meeting for the new session of this Society was held at the Cutlers' Hall, Sheffield, on the 9th inst., when Mr. E. M. Gibbs, the President, gave an address. An opportunity was afforded of inspecting the works of the Sheffield Artists' Society, which were on exhibition. The President, in the course of his address, reviewed the work of the Society since its foundation in the Royal Jubilee year 1887. He pointed out that much solid work had been done, and that the objects for which the Society had been established had not been forgotten, and were in a fair way of being realised—to wit (*a*) the advancement of the profession; (*b*) the promotion of means for acquiring a knowledge of the various arts and sciences connected therewith, and the education of the junior members thereof; and (*c*) the consideration of questions of professional practice. They had been the first provincial society to ally themselves to the Royal Institute of British Architects in London, and while having kept their own independence they had secured many solid educational and other advantages from the alliance. Sheffield had been recently constituted the centre of an important north-country district. Their society had co-operated with the Royal Institute in the scheme of examinations, and they had, under the care of Mr. J. R. Wigfull, formed classes for the better education of the rising generation of Sheffield architects. Many lectures had been given on scientific and artistic subjects by the first men of the day. The number of members—over seventy—was greater than originally, and they had a substantial balance at their banker's. They had learned to know each other, and it only remained for them to work heartily together for their common good. On the motion of Mr. J. B. Mitchell-Withers, vice-president, seconded by Mr. F. Fowler, and supported by Mr. Hadfield and Mr. Innocent, a hearty vote of thanks was awarded Mr. Gibbs for his presidential address.

GLASGOW ARCHITECTURAL ASSOCIATION.—The usual monthly meeting of this Association was held in the rooms, 114, West Campbell street, on the 3rd inst., when a paper was read by Mr. Walter R. Watson on "The Symbolism of Architecture." After explaining the uses of symbolism in the early Christian church, an account was given of its origin and development from the Egyptian down to the Medieval period, special reference being made to the nimbus and Constantine's monogram, the latter being probably the origin of the Celtic Cross. The application of symbolism to church planning was next noticed, together with the various opinions held as to the spire and roof-vauling. A discussion followed, and at the close the essayist received a hearty vote of thanks.

SKETCHES AT THE ARTS AND CRAFTS EXHIBITION.

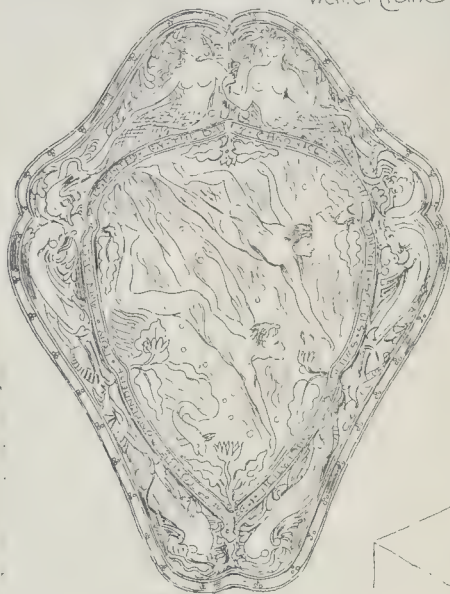
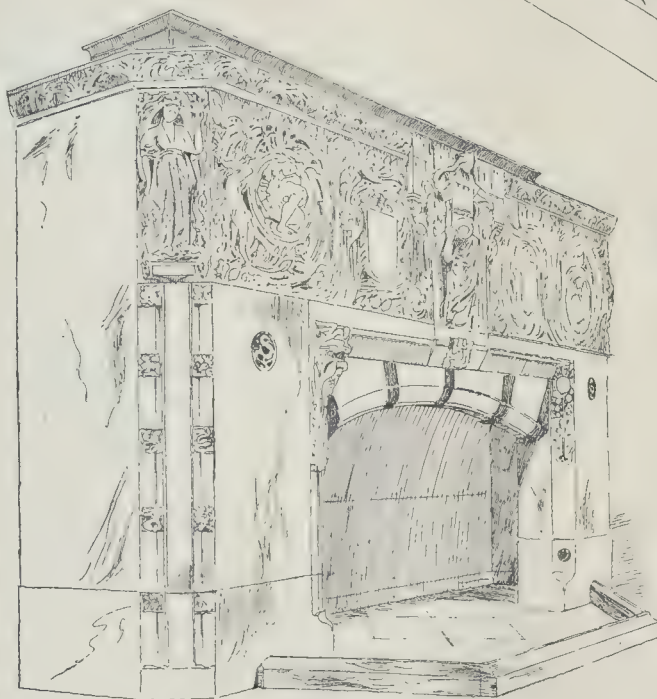
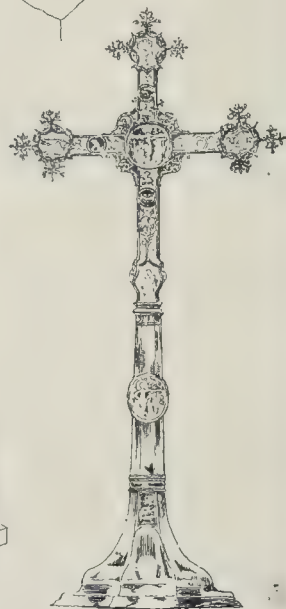
THE two pages of sketches here given include a good many of the objects which we noted as of



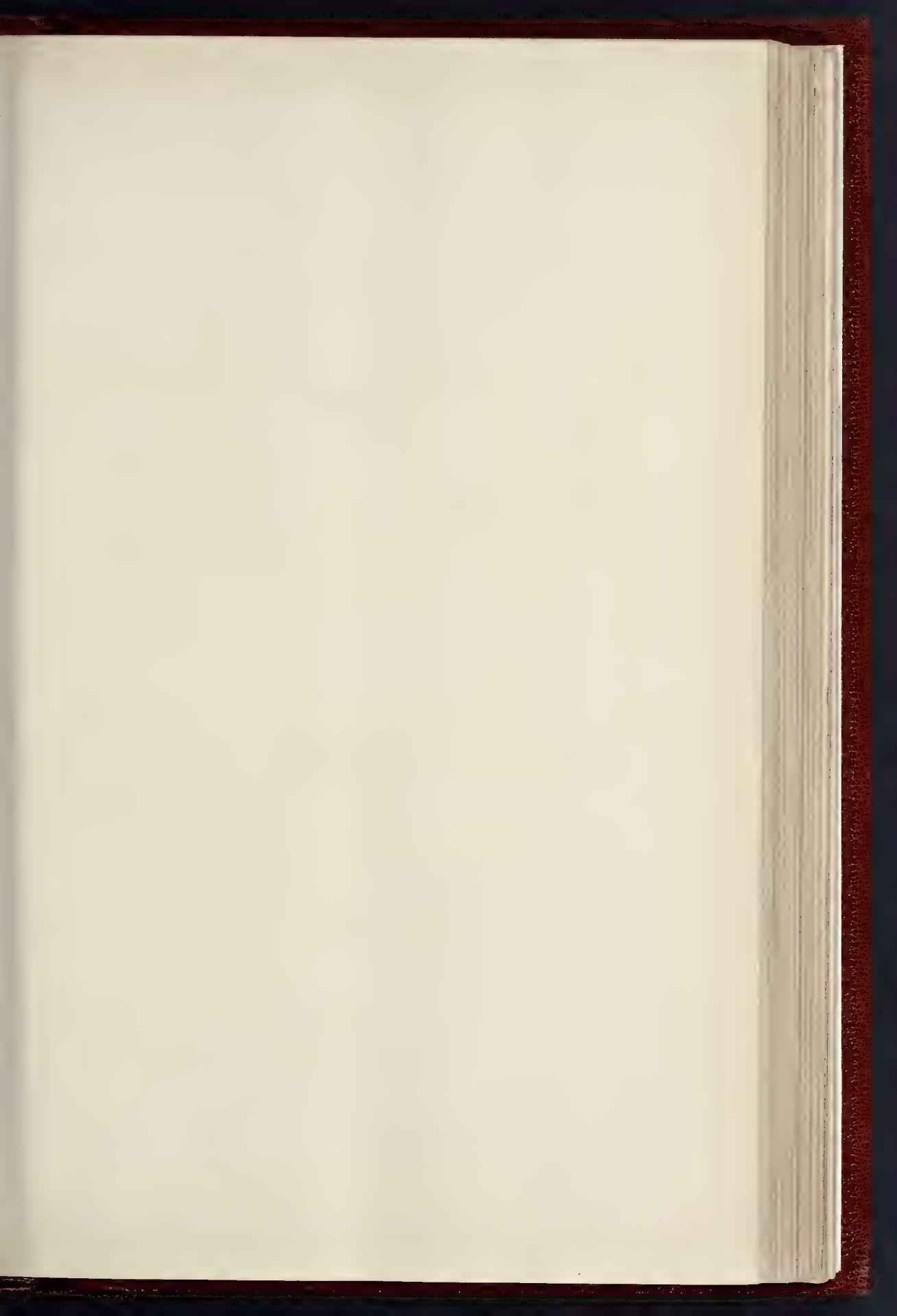
special interest in our review of the exhibition last week. Mr. Spooner's writing-table, for which there was not room in the two pages, is illustrated in a separate sketch.

EXTENSION OF MUNICIPAL BUILDINGS, LUTON. Extensions to Luton Municipal Buildings have just been completed under the superintendence of Mr. T. R. Roscoe, the Borough Surveyor.

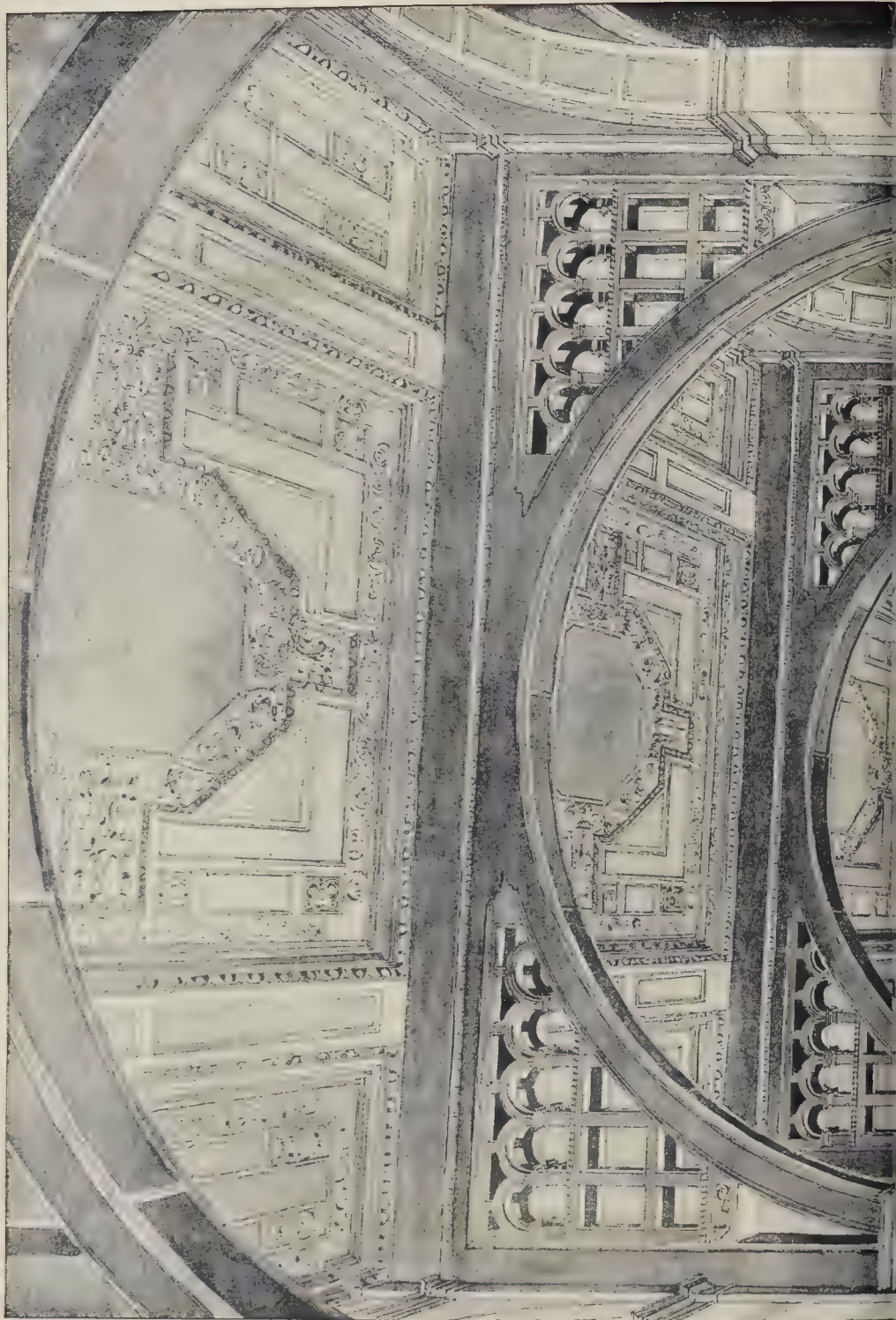
The Arts and Crafts Exhibition.

44. Repoussé Copper Shield - by
Walter Crane276 Font for the
Private Chapel
Welbeck Abbey.
by H. Wilson.Chimney-Piece in carved Alabaster 176
by H. Wilson & F.W. Pomeroy.Altar Cross for Welbeck Abbey
by H. Wilson.

H. J. Paul del.



THE BUILDER, OCTOBER 14, 1903



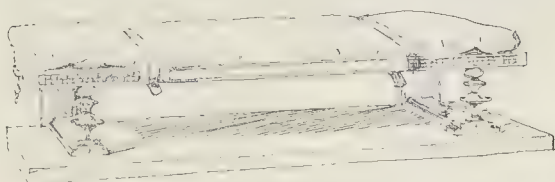


THE STAIRCASE IMPERIAL INSTITUTE M^S T E COLLECT^D. FRIBA. ARCHITECT

Real. Author. Edition 1893

The Arts and Crafts Exhibition

Sketches of Furniture, &c.
in North & West Rooms.

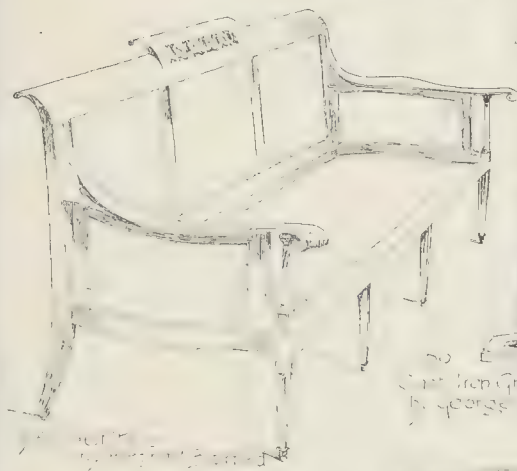
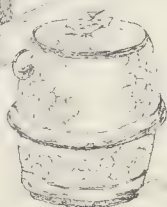


101. Table or Bench
by L. A. M. T. J. M. A.

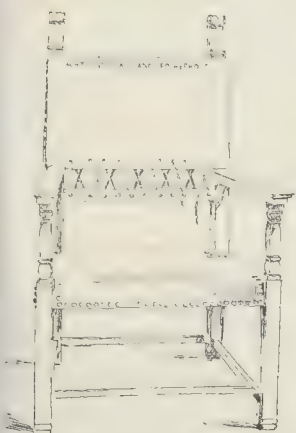


108. Tea Set, &c.
by W. A. P. S. S.

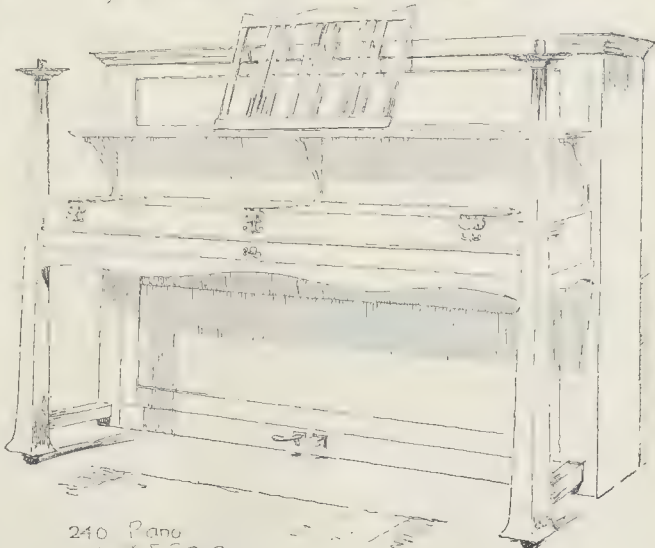
102. Tobacco Pot
by John Gibson



103. Chair
by George Jones



105. Arm Chair
by W. A. P. S. S.



240. Piano
by W. A. P. S. S.

Sketches at the Arts and Crafts Exhibition.

NOTE.—The form of Pianoforte-case represented among the above sketches is the copyright of the maker, Mr. C. Hechstein.

Illustrations.

STAIRCASE, IMPERIAL INSTITUTE.

THIS is a view of the principal staircase and entrance-hall. The columns are of Numidian marble, which is also used elsewhere in bands. The pedestals and dado are of Lumachelle, the remainder of the marble work being principally Serenicolin. The caps and bases are of bronze. The ceiling is of ornamental plaster, and this, and the wall space generally, are intended for future colour decoration. The staircase was erected by Messrs. Mowlem & Co., from the designs of Mr. T. E. Colclutt, the marble work being executed by Messrs. Burke & Co.

The drawing was hung in the Royal Academy Exhibition of this year.

LUCKNOW CATHEDRAL.

THE new Lucknow diocese was formed last year by taking the north-west district of the diocese of Calcutta, and making it a separate bishopric, that of Calcutta having become unmanageable by reason of its vast area.

The Rev. H. Clifford was duly installed as first bishop last February.

The church was commenced some years ago, but quite lately has been rearranged with a view to its being the cathedral for Lucknow, and seven bays of a large nave, to hold over a thousand persons, have just been added. The complete nave will be nine bays long, the last two with the western façade and towers and spires having still to be erected. The whole, when finished, will form a church of 250 feet long.

It is constructed of solid masonry of cream-coloured sandstone with redstone dressings.

The architect is Mr. W. Emerson, and the drawing was exhibited at the Royal Academy of this year.

COLCHESTER PUBLIC LIBRARY.

THE illustration we give of the Public Library, Colchester, is taken from the drawing recently exhibited at the Royal Academy.

The ground-plan is shown in the corner of the illustration, and we also illustrate a working detail drawing of the main gable showing the oriel window, which, with the barge boards and timber raming, is all to be in wainscot.

Last Friday, the 6th, was the occasion of the ceremony of placing a memorial tablet in the west, or end, wall of the large reading-room by the Mayor of Colchester. The tablet records the names of several munificent donors through whose generosity the building has mainly been inaugurated.

The Mayor was accompanied by the Right Hon. the Lord Mayor of London, Sir Stuart Knill, Bart., LL.D., and the Mayors of Ipswich, West Ham, Sudbury, Chelmsford, and Maldon, together with the borough Member, several other Members of Parliament, and other officials.

The Mayor was presented with a handsome silver trowel with a representation of the building, beautifully engraved, at the back from a drawing by the architect.

After placing the tablet, the Mayor requested the Lord Mayor to fix a large sculptured bas-relief of white marble representing the opening of the 1851 Exhibition by Her Majesty Queen Victoria, presented to the town by Alderman J. N. Paxman. The Mayor having presented the Lord Mayor with a suitable trowel, the huge block was then lowered and declared to be truly laid by his lordship.

The company then adjourned to the Corn Exchange, where they were joined by H.R.H. the Duke of Cambridge, Lord Claude Hamilton, and many other distinguished guests, numbering in all 400, and sat down to the annual Oyster Feast, one of the ancient municipal feasts which has survived to the present day. The tables were decorated with roses and laden with oysters. The toast lists, designed by Mr. Brightwen Binyon, were decorated with roses and with the oyster dredgers and tackle used in the fisheries, the front page being adorned with drawings of the fine town mace and one of the ward maces, the loving-cup, and other old town plate, with a peep of the picturesque outline of the town against the western sky, and on the fourth page was an illustration of the new Public Library.

The toast-list was accompanied with a well-printed little account, written by the Mayor, of some of the ancient feasts of the municipality, and presented to his guests as a memento of the occasion.

The building is being carried out by Mr. Chas. E. Orfeur, of Colchester, from the designs and under the superintendence of the architect, Mr. Brightwen Binyon, of Ipswich. The contract price is 3,109/. Besides the general view of the building, Mr. Binyon has also been good enough to furnish us with a tracing of the detail working drawing of the bay window, which forms a separate lithograph illustration.

A DOCTOR'S HOUSE IN THE COUNTRY.

THE plan contains a spacious hall with the staircase starting from the middle. On the left are two drawing-rooms with folding-doors and large bay windows. On the right is the dining-room, conveniently situated for access from the kitchen and butler. In the rear of the dining-room, with a separate entrance from the road, is the consulting-room, with large bay window, and drug store, waiting-room, lavatory, &c. The consulting-room is placed in a convenient position, shut off from the other portion of the house, yet within immediate communication therewith. Ample lavatory and w.c. accommodation is provided. The kitchen offices consist of kitchen, butler's pantry, scullery, larder, china and plate safe, wine-cellar, coals, wood, game-larder, and fruit-store in basement, and w.c. for servants. On the first floor are six bedrooms, with bathroom, lavatory, w.c., linen closet (warmed by the hot-water supply pipes to bathroom), housemaid's closet, and many useful cupboards. The landing is lighted by a large lantern-window in the roof. The principal bedroom has a dressing-room attached. There is room in the roof for two attics. The exterior is of a simple and homely character, suggesting a country gentleman's house, and the building (the cost of which is estimated at 2,300/.) is designed to suit a provincial town.

The architect is Mr. E. B. Lamb, and the drawing was exhibited at the last Royal Academy Exhibition.

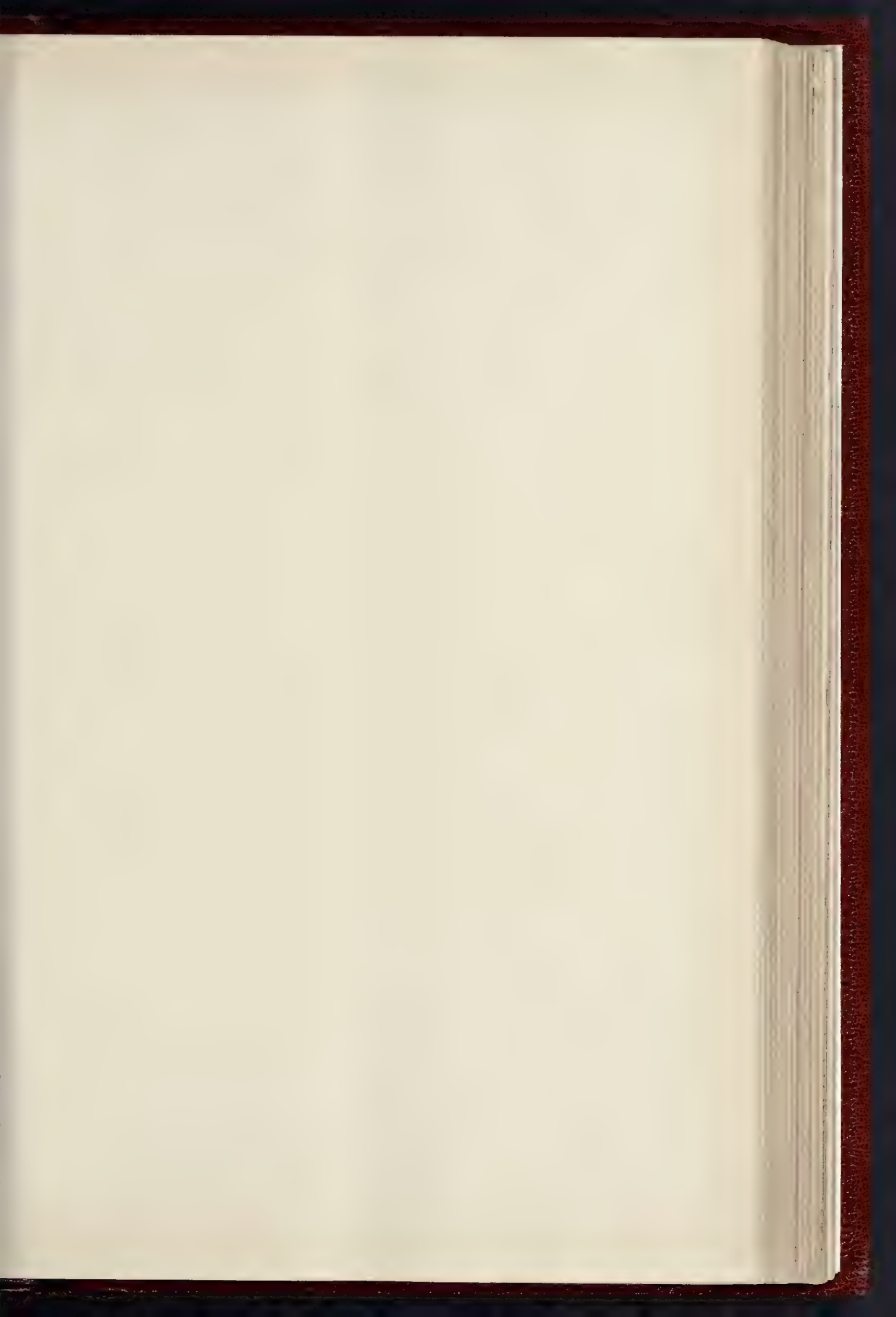
ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS.—A visit has been paid this week by the Society of Engineers to the Tottenham and Forest Gate Railway. This important link in the suburban railway system of the metropolis, and equally important connexion between the Port of London and the Midlands, is now in course of construction. The line is six miles four chains in length, and the object of its construction is to make a connexion between the Midland Railway Company and the London, Tilbury, and Southend Railway Company, and the Tilbury Docks; to provide additional railway accommodation for the extensive and growing district to the east of the valley of the River Lea; and to provide coal depots on an extensive scale along the line, to the manifest advantage of the railway and district. The line starts by a junction with the Tottenham and Hampstead Railway at the South Tottenham Station, and passes between the great reservoirs of the East London Water Company, into Walthamstow. It passes then successively through Leyton, Wanstead, West Ham, and East Ham, finally making a junction with the Tilbury line at Forest Gate, near Romford-road. At each of the above points the line passes through a populous district, which necessitates the demolition of no fewer than 243 houses. A considerable proportion of these being artisans' dwellings, the company has had to build seventy new houses under the clauses of the Act of Parliament providing for the re-housing of the working classes. Besides the poorer class of houses, the railway company has had to acquire others of greater pretensions, for the line passes through the grounds of no fewer than five old Essex mansions. Four of these were formerly occupied by wealthy City merchants, while the fifth is of historical interest, being the Royal Lodge at Leytonstone, where King Charles II. used to stay when hunting in Epping Forest. Intersecting, as this railway does, a considerable number of roads and streets, it is not surprising that in its comparatively short length of a little over six miles, there are no fewer than seventy-two steel bridges, absorbing about 4,000 tons of Siemens-Martin steel. Of these bridges fifteen are over and fifty-seven under bridges of various spans and types, no two being alike, while most of them are skew bridges, in one of which the rear end of the girder on one side is about on a line with the forward end of the girder on the other side. The line for about half its length is

carried on embankment and in cutting, but three miles of it, or a length equal to that of the Greenwich Railway, consists of a viaduct of brickwork arches each of 30 ft. span. The gradients throughout are easy, and the curves good. Concrete is largely used in the construction of the various works, especially in the retaining walls. Considerable expense has been incurred in the diversion of sewers and watercourses, particularly at Walthamstow. There will be five passenger stations and four goods and coal depôts along the line. The stations will be at Black Horse-road and Shrubland-road, Walthamstow, respectively; Leyton High-road, Leytonstone High-road, and Wood Grange-road, Forest Gate. Three of these stations will be built on arches, the other two being in cutting, and in each case the platform will be 500 ft. in length. There will be 81,894 cubic yds. of brickwork employed in the construction of the line, involving the use of upwards of 30,000,000 bricks. There will be about 4,000 tons of steel and ironwork, exclusive of rails and permanent way, while there are over 300,000 cubic yds. of excavation. The contract amount is 264,422/., exclusive of station buildings. Nearly 1,000 hands are engaged on the works, together with four locomotives and a number of steam cranes. The engineer of the railway is Mr. Arthur C. Pain, M.Inst.C.E., of Westminster, the resident engineer being Mr. Arthur Nunn. The contractors are Messrs. Lucas & Aird, whose agent on the works is Mr. Henry Turner. The line was commenced in August, 1891. When completed, the line, besides providing for the growth of outer London, will place the system of the Midland Railway Company in direct communication with the Tilbury Docks.

THE JUNIOR ENGINEERING SOCIETY.—The annual general meeting of this society was held last Friday at the Westminster Palace Hotel, the retiring chairman, Mr. Sidney Bondings, M.I.Mech.E., in the chair. From the Council's report on the proceedings of the past session, which was read by the secretary, Mr. Dunn, it appears that the society continues to be well fulfilling the objects for which it was formed. The total membership now numbers 330, an increase of 13.4 per cent. during the session. It was stated that Mr. John Wolfe Barry had accepted the presidency for the ensuing session, 1893-94. Eight meetings had been held, and fourteen visits to works, &c., arranged, exclusive of the summer excursion to the West of England. The average attendance at the meetings was fifty-six, and at the visits sixty-five. The society's premium had been awarded to Mr. R. W. Newman, Assoc. M.Inst.C.E., for his paper on "The Sanitary Engineering of Dwellings." The balance-sheet, after having been duly certified to by the appointed auditors, showed receipts as 320l. 19s. 4d., and expenses as 306l. 1s. 8d., leaving a credit balance of 14l. 17s. 8d. On the motion of the chairman, the report and statement of accounts having been adopted, and a vote of thanks passed to the retiring officers, various motions in reference to revision of rules were discussed. It was agreed that, under certain circumstances, the Council have the power to remit members' subscriptions. A system of compounding for future subscriptions was approved of. The election of officers and council for the ensuing session resulted as follows:—Chairman, Percy J. Waldram; vice-chairman, Henry J. Young; hon. librarians, H. B. Vorley; hon. auditors, F. W. Page; W. H. De Ritter; council, R. W. Newman, W. H. De Ritter, Harry Fraser, P. Marshall. Remaining in office:—Council, P. G. Bowens, Basil H. Joy, Ernest King, Loftus Perkins, secretary and treasurer, W. T. Dunn.

MISSION HALL, CARDIFF.—On the 6th inst. the commemorative stone of a new mission hall now being erected in Cowbridge-road, Cardiff, was laid by Lord Windsor. The building is being erected as a memorial to the late Mr. David Davies, Llandinam. It consists of a hall to accommodate 1,100 people, having a gallery running round three sides of it, and a platform at the end capable of holding a large choir. Under this platform are ante-rooms, and there are also two small rooms on either side of the main entrance. A smaller hall has already been erected at the rear, and it is proposed to build shops on either side facing Cowbridge-road. The front of the building is to be carried up in red Catbrook bricks with Bath stone dressings. The contract price is 2,575/., and has been let to Mr. C. C. Dunn, of Cardiff, who is carrying out the work from the designs of Messrs. Habershon & Fawcner, architects, of Cardiff.



THE BUILDER, OCTOBER 14, 1893

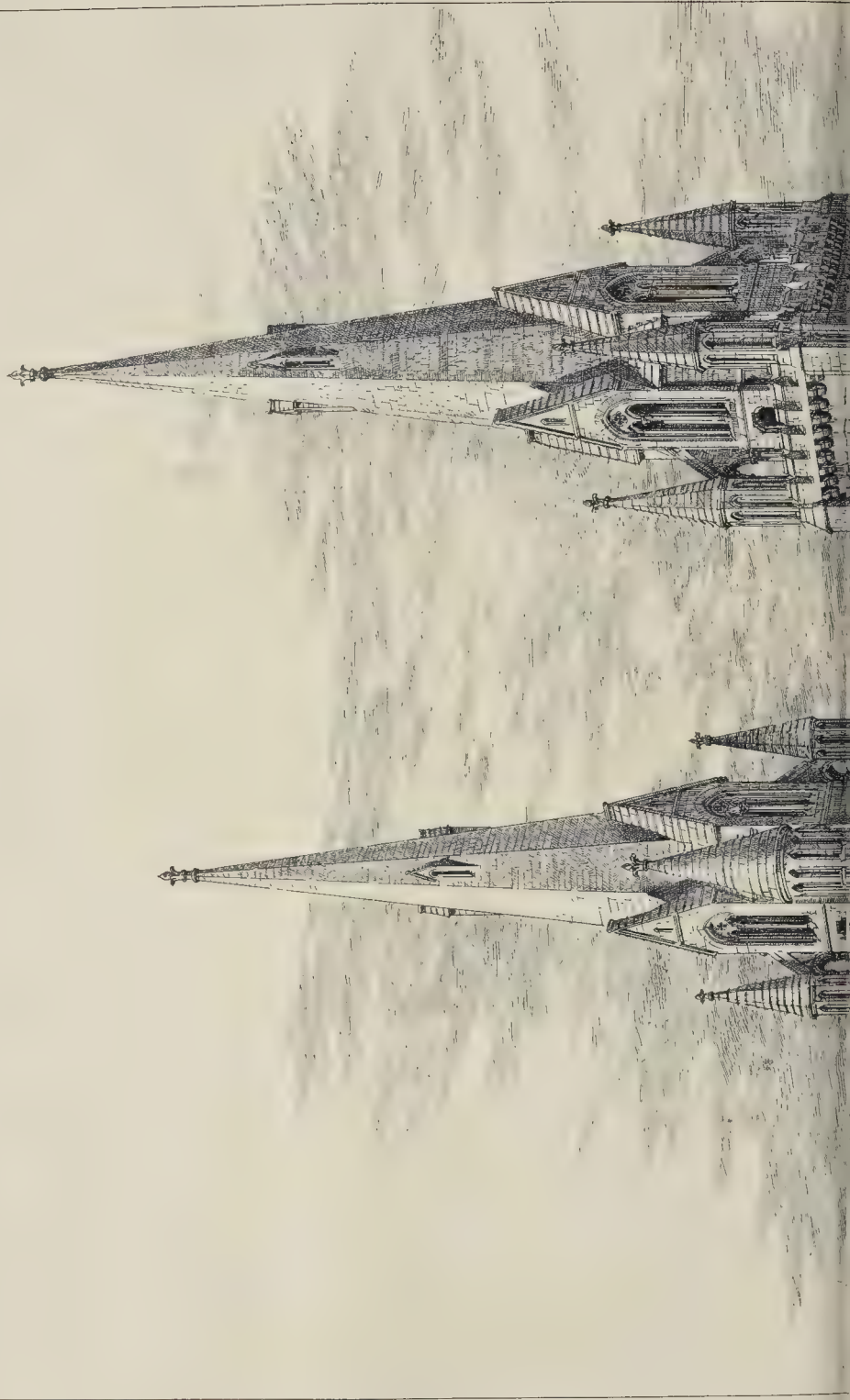
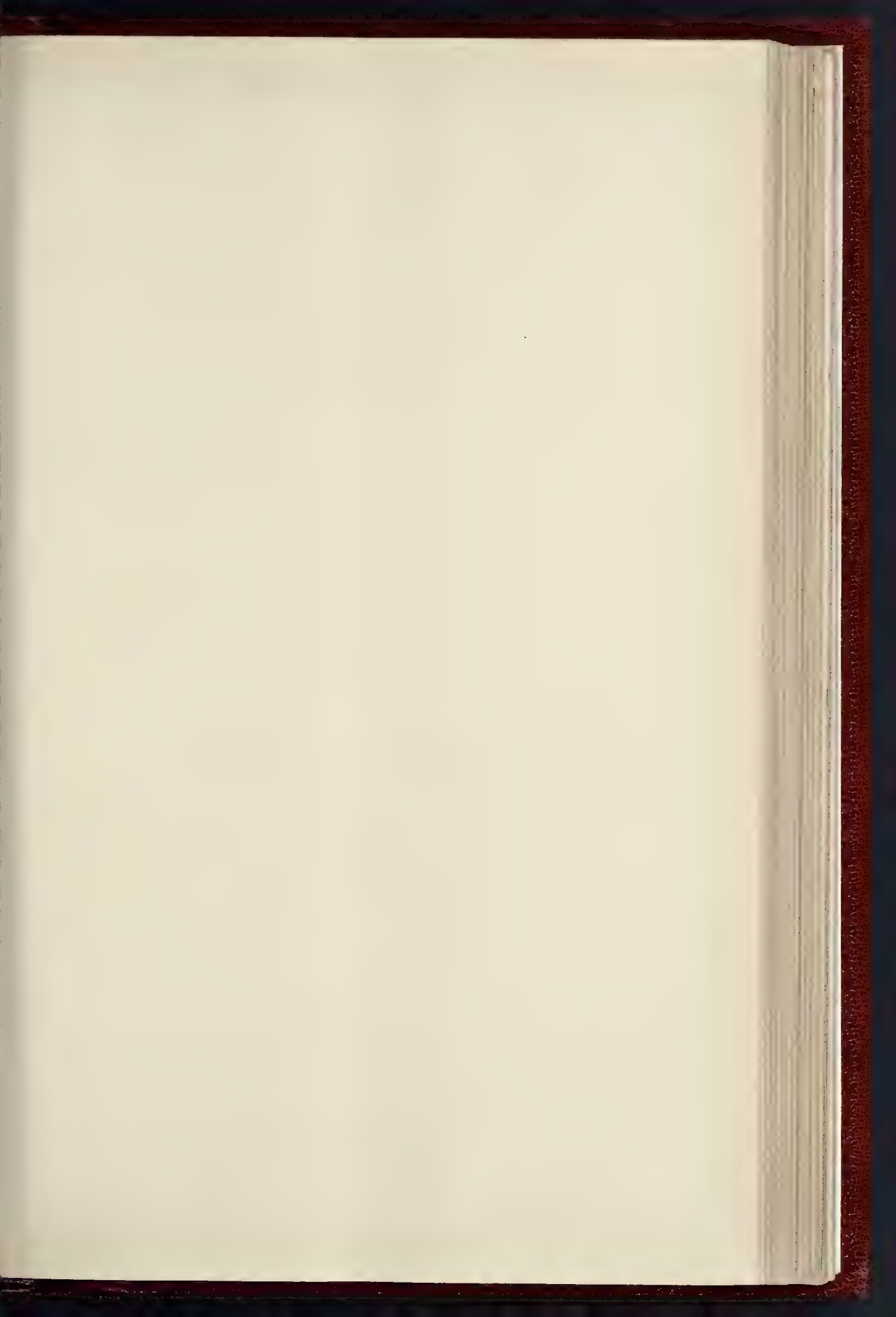




PHOTO LITHO. SURGEON, F.R.S. EAST-WARDEN STREET - LITTON, LANE E.C.

WEST FRONT OF THE CATHEDRAL FOR THE NEW LUCKNOW DIOCESE, INDIA.—MR. W. EMERSON, F.R.I.B.A., ARCHITECT.



THE BUILDER, OCTOBER 14, 1893

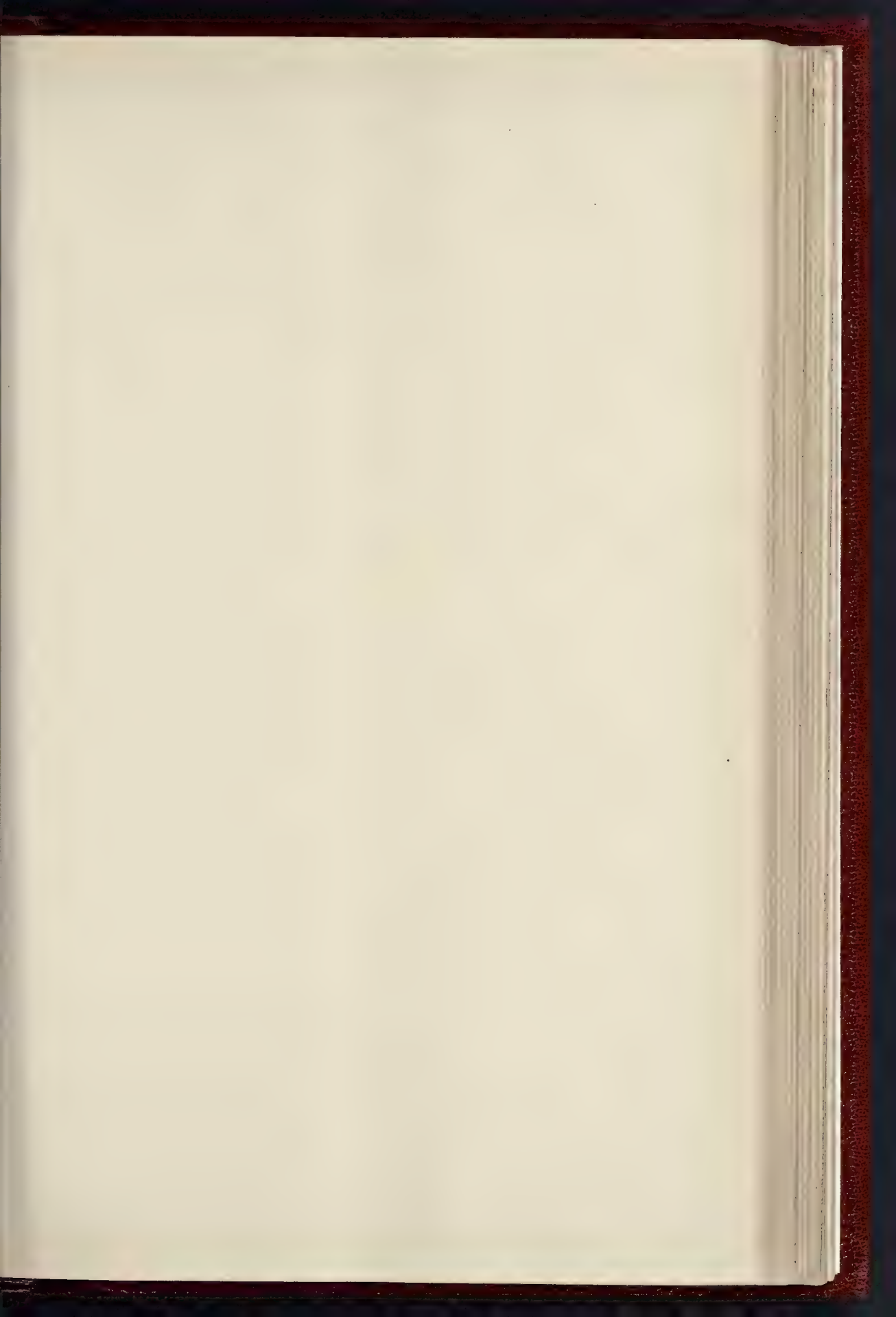




Royal Academy Exhibition, 1893

A DOCTOR'S HOUSE IN THE COUNTRY.—MR. E. BECKETT LAMB, ARCHT.

—DRAWN BY J. H. B. AND E. J.



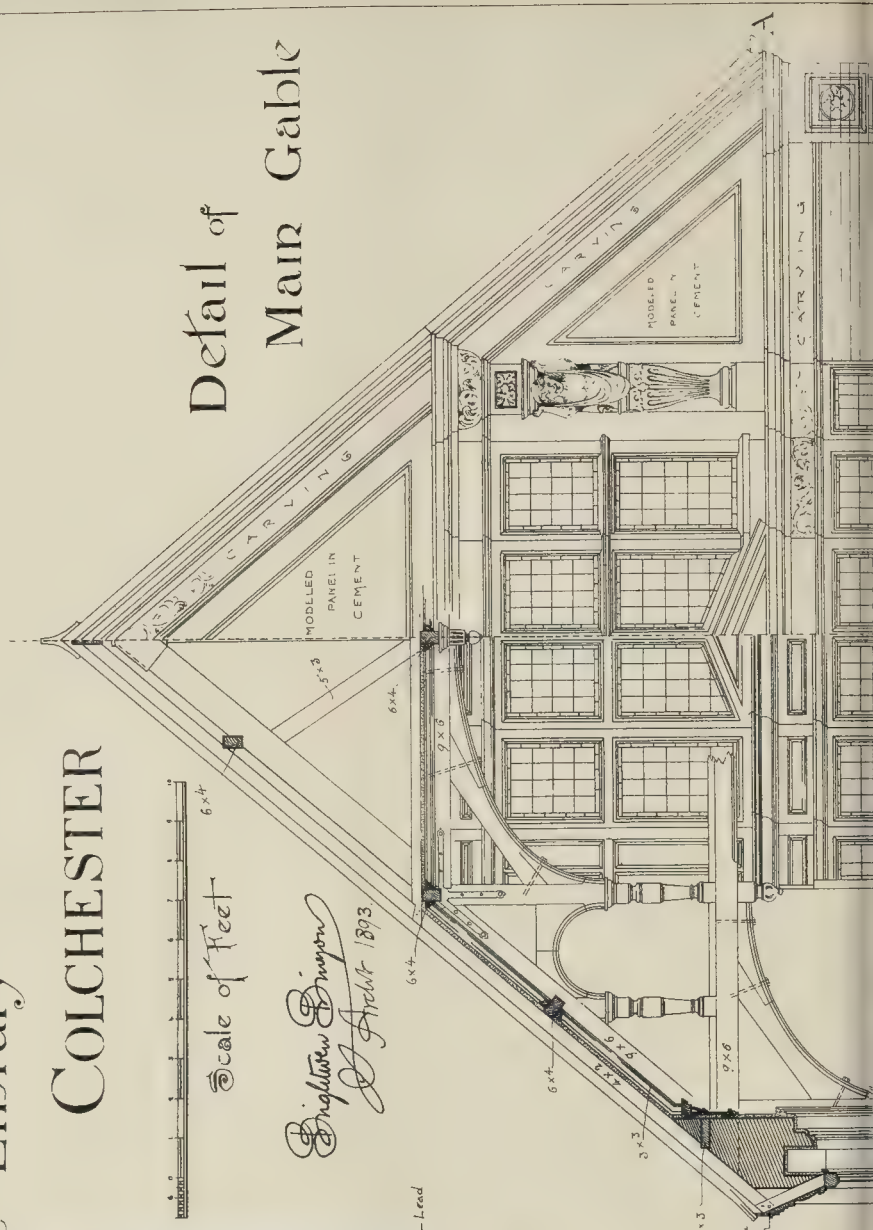
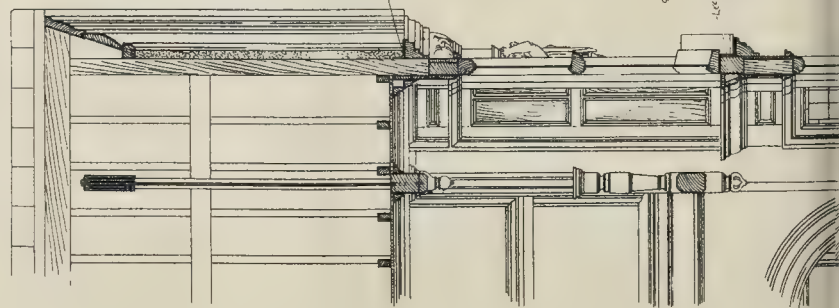
Public Library

COLCHESTER

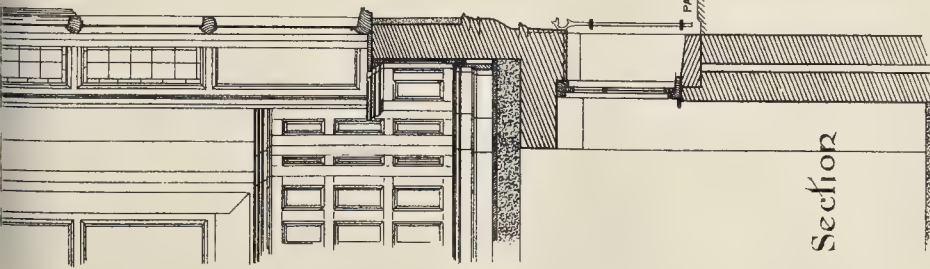
Scale of Feet
1 2 3 4 5 6

Erington Simpson
Architect 1893

Detail of Main Gable



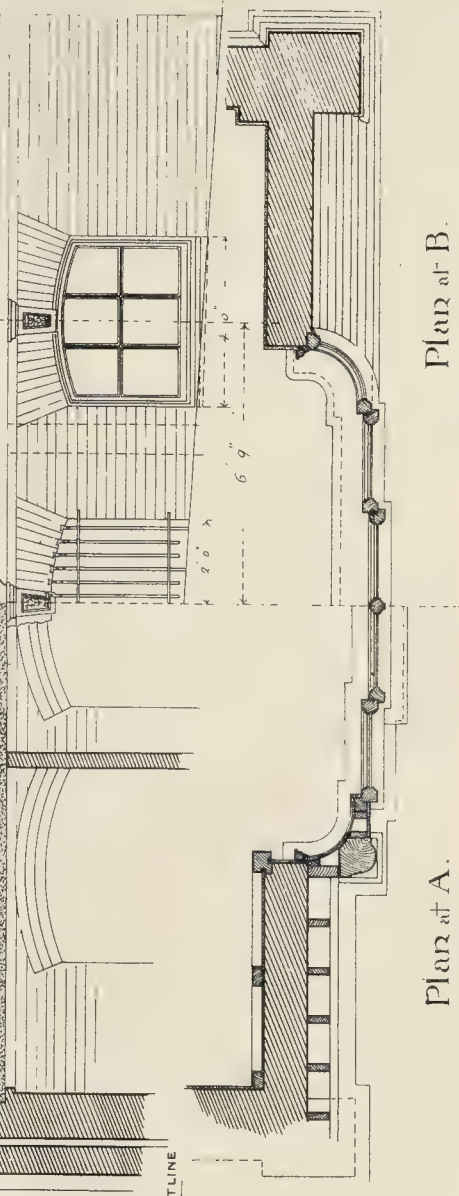
Elevation



Elevation



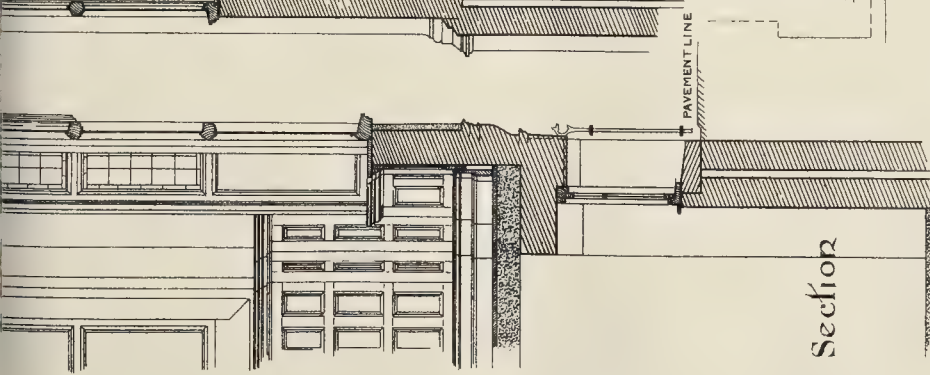
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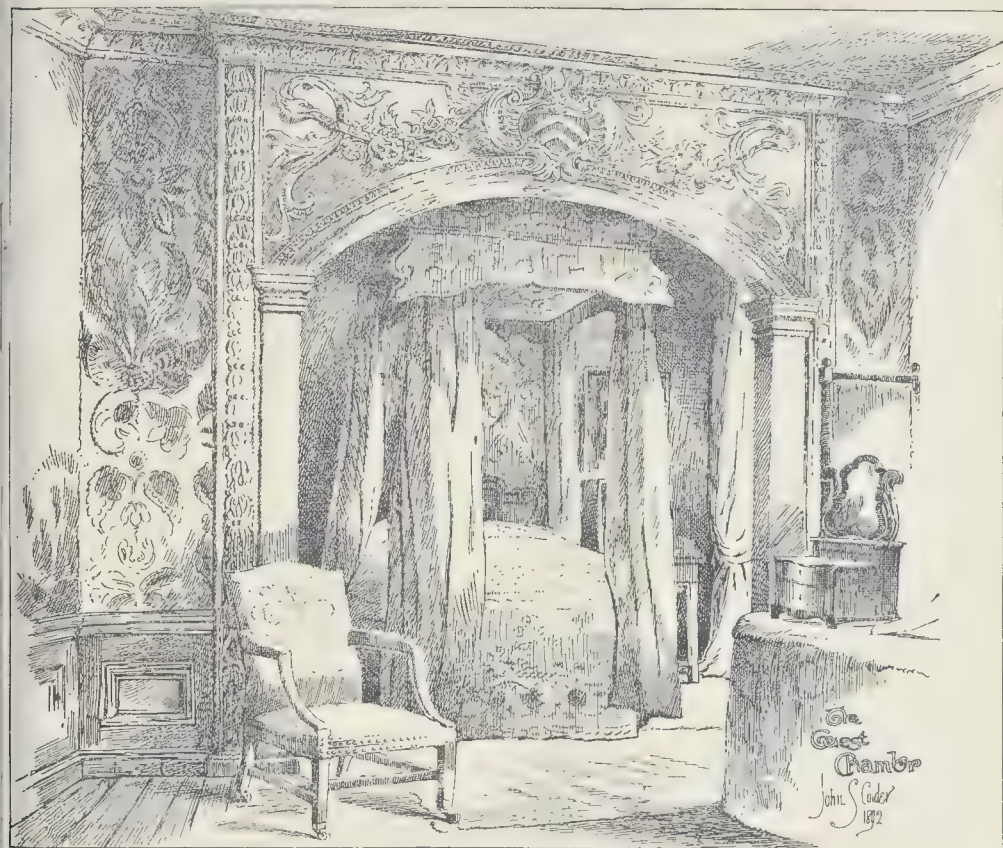


Plan at B.

Plan at A.

Section





From Illustrations of Christchurch or Withpole House, Ipswich.—By Mr. J. S. Corder.

THE GUEST CHAMBER, CHRIST CHURCH, IPSWICH.

This illustration is reproduced, by permission, from Mr. John S. Corder's monograph* on the very picturesque old house known as Christchurch or Withpole House, near Ipswich. The place derives its name from a Priory of Austin Canons founded in 1177, in the church of the Holy Trinity, just outside the North Gate of Ipswich. The house seems, from the illustrations appended to the historic account, to be a charming old place. Mr. Corder, who has done a good deal to illustrate the antiquities of his neighbourhood, and whose occasional "Wayside Notes in East Anglia" will be remembered as occurring from time to time as among our lithograph illustrations, gives a measured plan, several views, and various details, on folio plates. The house is on what may be called the E plan, but not symmetrical, one arm of the E being a good deal wider than the other. The porch forms, as usual, the central projection facing the courtyard. The volume is an interesting collection of illustrations and historical information.

MAGAZINES AND REVIEWS.†

The *Gazette des Beaux-Arts* contains a long and well-illustrated article on the collection of arms in the Musée d'Artillerie, which the writer, M. Maurice Maindron, maintains to be the finest collection of the kind in the world. M. Paul Mantz furnishes the second of two articles on the life and works of Largillière, with a reproduction of its remarkably fine and dignified portrait of Mdle.

* Ipswich: S. H. Cowell.

† The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

de Barral. M. Marcel Reymond continues the subject of Florentine sculpture in the fourteenth and fifteenth centuries, taking the expression "Florentine" apparently as including Italian work of the period generally, as this article deals mainly with the sculpture of Siena and Orvieto, and with the characteristics of the Sienese school of sculptors, whom he describes as remarkable for energy of style with little feeling for the best effects of relief. In this he considers the French cathedral sculpture of the same period far surpasses the Italian work. M. de Champeaux continues his interesting and valuable series of articles on "L'Art Décoratif dans le Vieux Paris," dealing in this month's number with some of the Renaissance hôtels and palaces which either have been or will be pulled down in the course of Paris improvements.

The *Art Journal* gives its readers good reproductions of two admirable pictures, Mr. Orchardson's "First Dance" and Mr. Croft's "Gunpowder Plot; the Last Stand." Among the articles is one on the work of the Italian sculptor, Rinaldo Carnielo, whose robust physiognomy, as indicated in the portrait, is in strange contrast with the morbid sentimentalism of his works. Mr. Day's article on "Design in Furniture" is hardly broad enough for its title, as it is really concerned mainly with the question of the best style of French furniture to be taken as types, if we must go after French furniture, but the following sentence should be worth noting by those concerned:—

"It is perhaps because manufacturers do not, as a rule, exercise much taste or judgment in the selection of what they shall reproduce, that one finds whatever style it happens to be the fashion to resuscitate so inadequate. The less remote its period from our own day the more nearly it may meet our wants; but it never quite meets them; and to reproduce, in these days, say, a Chippendale settee in the likeness of three chairs 'all in a row,'

is to forget the advance we have made of late in the direction of ease and material comfort."

We might add, it is to forget that what we want, to make furniture interesting, is design and not copying. In the fifth article, on "The Tate Collection," by Mr. Walter Armstrong, we entirely concur in the eulogistic and discriminating critique on Mr. Stanhope Forbes's "Health of the Bride," which we agree with the writer is the best picture this artist has produced.

To the *Magazine of Art*, Mr. Claude Phillips contributes a good critical article on the sculpture of the year, though we cannot agree with him in the rather low estimate he forms of Falguière's "Poésie Héroïque." Mr. Garnet Smith's article on "Jules Breton," with numerous illustrations, is both sympathetic and sound as a criticism. Miss Sophia Beale writes on the sculpture of the Paris Cathedral, under the title, "Notre Dame and Medieval Symbolism." It is a curious omission that nothing is said of the remarkable crowning figures of the towers, perhaps the most striking things, in their way, in Medieval sculpture.

The *Studio* is an admirable issue, containing among other things a number of illustrations (from photographs) of modern room-furnishing produced as illustrations of an article by Mr. J. S. Gibson on "Artistic Houses." We may observe, however that, as a reaction from the former neglect of furniture and decoration, there seems now to be a disposition to regard the artistic element in a house as exhibited almost entirely in the accessories. Surely it should be shown first, and chiefly, in the plan and architectural design, of which the plan is an integral element. Among other things, illustrations are given of the designs by which the students of the Birmingham Art School are proceeding to decorate the interior of the Town Hall with scenes from Birmingham history; a spirited

scheme which we hope may turn out satisfactory in result.

In the *Quarterly Journal of the Royal Society of Antiquaries of Ireland*, always replete with interesting and apparently carefully collected and trustworthy information, one of the most interesting items to us is the description and illustration of some of the old "weavers' candle-holders," a curious form of ancient utensil which is becoming very rare, and affords an interesting example of artistic form of a simple kind arising out of practical needs. These metal candlesticks may be compared in form to a very long-stemmed tobacco-pipe with the thin end of the stem bent round into a hook, and the bowl of the pipe sharply returned on the line of the stem. These were intended to hang by the hook on a line stretched across the loom, the bowl with the candle hanging down just in front of the work. There is a curiously antique style about these articles, which would hardly look out of place among the Roman metal utensils in the British Museum. Mr. T. J. Westropp contributes an article, with a plan and some illustrations of masonry, on "The Pre-historic Stone Forts of Central Clare" at Moghane and Langough. There is a very curious resemblance in the general plan of Moghane Fort to some of the remains found by Mr. Bent in Mashonaland. "The Antiquities of Ullard, co. Kilkenny," is an interesting communication, with illustrations of a doorway (of Norman fashion) and an ancient Irish cross.

The *Illustrated Archaeologist* (September number) is going on admirably; the illustrations are numerous and excellent, and in this respect the magazine supplies a want. Among the subjects treated of and illustrated in this number are "Some Carved Doorposts in Brussels," "Stonehenge," "Silchester," "Sculptured Tombstones of Argyllshire," &c.

Among the special subjects on which information is given in the *Antiquary* are the discovery of a buried well in the grounds of the new weir, Kenchester, and the discovery of a Roman altar at Lankester. The notes of the month give interesting information on various subjects.

In the *Reliquary* the most important article is "Notes on the Cathedral Churches of Sweden," by Mr. T. M. Fallow; dealing in this number with Linköping, of which several illustrations are given. The fourth of a series of articles on "Old English Pewter," is useful for historical information on the subject.

To the *Fortnightly Review* Sir Robert Ball communicates an article on "Atoms and Sunbeams," a popular explanation of the atomic theory of matter and of the reasoning by which the knowledge of the existence, action, and speed of atoms is arrived at; we say "knowledge," for the reasoning seems unanswerable, yet it is difficult to speak of "knowledge" of mechanical facts which we cannot verify either by sight, hearing, or touch. The main point in the article is the author's reasoning in regard to the radiation of heat from the sun, which he does not appear to consider as constantly and steadily diminishing, as we have been accustomed recently to be told by astronomers. The subject is one on which only an exhaustive study of phenomena can justify anyone in expressing a positive opinion at all; and Sir Robert Ball is not too dogmatic; but his paper will be found very interesting by those readers who have the patience and the mental power to follow out and realise his argument. The same number of the *Fortnightly* contains an article on "The Unemployed" by Mr. Arnold White, which does not seem to lead to any certain conclusions, and an extract from the last diary kept by the late J. A. Symonds, "Notes of a Journey in South Italy," which had been intended as the material for an article. Some of the notes deal with architectural details in rather out-of-the-way places, and may be of interest in this respect to architects visiting the part of Italy referred to.

In the *Nineteenth Century* we have an article by the Hon. Reginald Lister on "The Archæic Statues of the Heropolis Museum," the collection of female figures with the same attitude and nearly the same expression, which present a curious problem to the modern sculptor. Mr. Lister supports the view that these mechanically smiling statues were meant to have some psychological expression, in opposition to the idea of the other school of critics, that the expression is only read into them by ourselves, and that the sculptor was mainly occupied with the yet only partially-mastered technical difficulties of the craft. The latter view seems to us the more probable, but in any case the article is a useful record and

description of the works it treats of. In the same number Mr. Jas. Mayor writes on "Setting the Poor to Work," and seems to come no nearer to any defined theory or method than others who are filling our periodical literature with disquisitions on the same subject; Professor Prestwich contributes an article on "The Position of Geology," which is in the main an attack on the "Uniformitarian" theory, that changes of the same kind have gone on at the same rate throughout the whole of geological time; though at the same time the author declines to accept altogether the position of the "Physicists," especially their conclusion as to the present great thickness of the earth's crust. The problem of the future, he suggests, is to adjust and harmonise the opposite results of the two classes of theorists.

The *Contemporary Review* contains a rather interesting and original article on "Chinese Art in Illustration of Chinese Character," by the Rev. W. A. Cornaby, the keynote of which is that the Chinese abhor a straight line, on superstitious grounds. Demons move in straight lines. "In a true horizon line are seen the undulations of the dragon." Therefore, a straight line belongs to Hades. Hence the extraordinary and perverse sinuosity of their paths. What is thus illustrated in their art belongs also to their character. They are crooked in their way of thinking. This explanation of the sinuosities of Chinese art is new to us, and seems rather fanciful and far-fetched. The author writes, however, as if he knew China well. He concludes that the Egyptians must have felt "the terror of the straight line," as shown in their flat horizons, but that in erecting edifices to break it they still preserved the straight line in all its power and terror. This remark makes us suspicious of the whole article. There is no doubt that the level architecture of the Egyptians was influenced by the character of the scenery of their country, but there is no reason whatever for supposing that they attached an idea of terror to the level line, in the sense in which he tells us the Chinese do. It was more probably with the Egyptians a question of grandeur and permanency of architectural expression.

The *Century* contains an article on Street-paving in America, with numerous sectional illustrations of various methods, and some views which show the deplorable results of bad paving in some of the principal cities of the States. The Americans are evidently waking up now to the importance of a practical subject long neglected by them. Mr. Fortune, the author of the article, takes the sound and correct view that the foundation is the most essential element in a pavement. To English readers the most interesting portion of the article is that on brick pavements, the extensive use of which for streets is almost an American invention. The writer takes a very favourable view of brick pavement, but admits that the test of time is still wanting to give us satisfactory evidence of its durability. The same number contains an article by Mrs. Van Rensselaer on "Frederick Law Olmsted," the landscape gardener who laid out Central Park at New York, and the grounds of the Chicago Exhibition; one on Madame Renner, the painter of cats, with some good illustrations from her works; a poem by R. W. Gilder on "The Vanishing City," in which the glories of the Chicago Exhibition are celebrated in the most hyperbolic ecstasy of praise; and a long account by Mr. T. R. Campbell of the Pratt Institute at Brooklyn, a school of technical training in art and industry which seems to be on an exceptional scale. A very beautiful illustration, "Light in Shade," gives an example of the work of Mr. I. H. Caliga, an American-born artist who received his art training at Munich. As a whole the number is an exceptionally good one.

Harper contains an article by Mrs. Pennell on "A French Town in Summer" (Toulouse to wit), with a number of charming accompanying sketches by her husband. "From the Black Sea to the Persian Gulf by Caravan," by Mr. Edwin Lord Weeks, with a number of admirable sketches, affords us a glimpse into a part of the world little known to most English readers. "The Childhood of Jesus," by Mr. Henry Van Dyke, seems to be "written up" to certain engravings from Italian masters. "Lispensard's Meadows," by Mr. Thomas A. Janvier, describes one of the old suburbs of New York, with some interesting sketches and a reproduction of a plan of New York in 1767. An article giving an American view of "Undergraduate Life at Oxford," by Mr. R. H. Davis, though it is little concerned with the artistic beauty of Oxford (to which, however, the writer is obviously not

blind), we call attention to because there is no profession that will not include readers to whom such a subject would be of interest. Wonderful to relate, there is for once not a word about the Chicago Exhibition throughout the number.

In *Scribner's Magazine* Mr. Doubleday gives us a very interesting and fully-illustrated article on the class of French artists who are mainly known as book illustrators. Mr. T. S. Hamlin writes on "Historic Houses of Washington," the interiors of some of which look wonderfully like old London houses, but the exteriors have a local character very decidedly marked. In "The Art of the White City," Mr. W. H. Low gives us another of those exuberant jubiliations over the effects of the Chicago Exhibition, with which American writers in American magazines have gone on month after month untiringly, as far as themselves are concerned, though many of their readers must have long ago commented, "Something too much of this."

The *English Illustrated* devotes an article to that now somewhat threadbare subject, "The Wax Effigies in Westminster Abbey," which are hardly worth all the literary fuss that has lately been made about them. The most interesting paper in the number is one on Ranelagh Gardens and its memories, by Mr. Austin Dobson, with some illustrations of the Rotunda, where once Handel played concertos on the organ as an accompaniment to the flirtations of beaux girl with swords and ladies in hoops. The illustrations are after paintings by Canaletti, and are probably truthful representations of the then aspect of the ground which is now the centre of Piccadilly.

Longman's Magazine includes an article on "A Winter at Davos," by Mr. C. W. Kennedy, which may interest those who, either from choice or a sad necessity, intend to try the same experience.

In the *Revue Générale* Captain E. Montheay concludes a series of articles "A Travers l'Exposition de Chicago," which is naturally in a more sober and restrained style of criticism than we are used to in the American magazines. It is not, he observes, the Paris Exhibition, "si gaie toute en étant hautement suggestive et intéressante: la World's Fair, plus étendue, plus énorme, plus colossale, mais moins achevée, moins artistique, moins séduisante, est autre chose." However, Captain Montheay sums up, "Incontestablement, ce n'est pas une exposition banale"; which we fear will hardly content the American reader.

In the *Gentleman's Magazine*, Miss Mary L. Sinclair has got together a good deal of historical information about the "Parish Church of the House of Commons," namely, St. Margaret's, Westminster. An article on "Life in Modern Egypt," by Mr. C. B. Roylance Kent, though mainly political, is not without interest in a picturesque sense. Science is represented by an article on "The 'Demon' Star" (Algol), by Mr. J. Ellard Gore, and one on "Some Curiosities of Geology," by Mr. G. W. Bulman.

The *Cornhill* gives some notes on "Camp Life in Cashmere," which are picturesquely written.

The *Pall Mall Magazine* is, as usual, an exceptionally good specimen of book-illustrating, which suggests rather a feeling of regret that such admirable illustrations should be thrown away on literary matter that is for the most part so tawdry and second-rate in style.

The *Strand* (September) devotes its "illustrated interview" to Mr. Hamo Thornycroft, his house, and his principal works, of which many illustrations are given.

Among the lighter magazines, *Belgravia* includes "A Consular Tour in Galicia," giving some information as to the country.

THE LONDON COUNTY COUNCIL.

At the usual weekly meeting of the London County Council, held on Tuesday at the County Hall, Spring Gardens, Mr. Charles Harrison, Vice-Chairman, presided in the absence of Mr. Hutton, owing to a domestic bereavement.

The County Rate.—On the recommendation of the Finance Committee, the necessary resolutions were passed for the making of a county rate of 6½d. in the pound, being 5'35d. in the pound for general county purposes, and 1'15d. in the pound for special county purposes. The total amount estimated to be required for the half-year to March 31 next was 891,562*l.*, and the rate yielded 890,749*l.*

The Shaftesbury Memorial Fountain.—The Improvements Committee brought up a long report

with regard to the Shaftesbury memorial fountain in Piccadilly Circus. The report was as follows:—

"We desire to call attention to the Shaftesbury memorial fountain, at Piccadilly-circus, which was unveiled and handed over to the Council on June 29 last. A few days after the unveiling ceremony we received a letter from Mr. Alfred Gilbert, the designer of the memorial, stating that 'he had had the painful experience of witnessing the utter failure of his intentions and design,' in consequence of the dwarfing of his design by the high wall surrounding the memorial, and of the inadequacy of the water supply. To remedy this Mr. Gilbert suggested (1) that the height of the enclosing wall should be considerably reduced; (2) that a 6-in. water main should be substituted for the two present 14-in. mains; and (3) that the space within the enclosing wall at present occupied by the stone steps should be used as an additional basin for the fountain, the four openings in the surrounding wall being stopped up in such a manner as to provide for a drinking place at each of the four points. To these suggestions we have given much consideration. We feel that some alterations must be made to the fountain before it can be pronounced satisfactory, and we believe the Council will see the necessity of authorising this additional work. It will perhaps be well if we deal with the suggestions made by Mr. Gilbert *seriatim*. With regard to the enclosing wall Mr. Gilbert contends, and we think justly, that it obstructs the view of the base of the memorial, and therefore gives the work a dwarfed appearance. Originally the wall was erected in compliance with the terms of the Metropolitan Improvements Act, 1889, but we are informed that the requirements of the Act would be met if the wall were lower than at present. We have no doubt that if the height of the wall were reduced to somewhat less than a foot above the pavement level the appearance of the fountain would be considerably enhanced. As this alteration will not involve an expenditure of more than about 25*l.*, we have decided to advise the Council to sanction it. We recommend—

(a) That the height of the wall surrounding the Shaftesbury memorial fountain be reduced as far as the plan, and that the work be done by the Works Department.

With regard to the supply of water, it is contended that the effect of the fountain is lost by the insufficiency of the supply. At the same time complaints have been made that the jets cause the water to spurt beyond the fountain and on to the public way. Mr. Gilbert states that these difficulties can be overcome by the substitution of a larger water main, as the increased pressure obtained thereby will not only add to the effect of the fountain, but will force the water into the basins instead of on to the public way. With this we are inclined to agree, but the effect can only be definitely ascertained by experiment. We have found that the pressure in the mains of the Grand Junction Water Company varies considerably, and that a large main would therefore be of little use. A sufficient and uniform supply, however, can be obtained by using as a motive power the water of the Hydraulic Power Company, that company having a main in the subway adjacent to the fountain, and by employing an injector the water could be forced through the jets at any uniform pressure, and the bulk of the water could be used over and over again. The water so supplied, though perfectly suitable for ornamental purposes, could hardly be used for drinking, and for this a separate supply would have to be provided. It is impossible, however, to form an adequate idea of the result of a good and uniform pressure without experiments, and we have therefore decided to ask the Council to sanction an expenditure for this purpose. The estimated cost of the actual work necessary for the experiments, or for providing a permanent supply of water with an injector, is 62*l.*, and we think the Council would do well to authorise us to expend a sum not exceeding 75*l.* We recommend—

(b) That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, an expenditure of a sum not exceeding 75*l.* be authorised for experiments in connection with the supply of water for the Shaftesbury memorial fountain.

The third suggestion made by Mr. Gilbert is that the four openings in the inclosing wall of the fountain should be stopped up, a pretty feature of the fountain being produced by the water being allowed to fall down the steps, thus the space within the enclosing wall would be used as a lower basin. Mr. Gilbert has offered to design free of cost the four drinking-places at the outer wall. We think the suggested alteration a good one, and accordingly recommend—

(c) That the space within the inclosing wall of the Shaftesbury memorial fountain be used as an additional basin, the four openings in the surrounding wall being stopped up in such a manner as to provide for a drinking place at each of the four points.

There is one more point connected with the fountain to which we desire to call attention. The Council on May 3, 1892, authorised us to provide for the connexion of the necessary water pipes with the fountain, the formation of the foundations, and the building of the inclosing wall. We then stated that the estimated cost of the works was 1,020*l.*, but we now find that that amount has been exceeded by 45*l.* 6*s.* 8*d.* We have satisfied ourselves

that the expenditure was necessary, and we recommend—

(d) That the additional expenditure of 45*l.* 6*s.* 8*d.* be sanctioned."

Mr. Moss moved as an amendment to refer the report back to the committee for further consideration.

Alderman Debenham seconded, and said he thought the Council should know who was responsible for the erection of the high wall which had dwarfed the memorial.

Mr. Beresford Hope said the fountain was out of place in its present position, and that a great many people were of opinion that it would be a fortunate thing for London if the fogs and the weather were to quickly act upon the structure.

Alderman Beachcroft said it was a pity they were not consulted as to the nature of the monument before they voted the first site in London for it. Could not the fountain be removed to a more suitable spot, say one of the public parks, so that the present site might be devoted to something more worthy of the great man in whose memory it was erected?

Other speakers having contributed to the discussion, a division was taken, with the result that the amendment was lost, 46 voting for it and 54 against.

Recommendation *a* was then agreed to.

On recommendation *b*,

Mr. John Burns, M.P., proposed an addition to the effect that the supply of water be confined to pure water only. If hydraulic water were used for display purposes, there would be the chance that children might drink it and poison themselves.

After further discussion the recommendation, with the addition suggested by Mr. Burns, was agreed to.

Recommendation *c* having been rejected,

Mr. Ward moved as an addition to the last recommendation that it be an instruction to the Committee to bring up an annual estimate of the cost of working the fountain.

The motion was agreed to, and the report, as amended, was adopted.

Tenders for the Isle of Dogs Bridge.—The same committee's report contained the following paragraph and recommendations, which, after some discussion, were agreed to:—

"We have considered the following tenders, referred to us on October 3, for the reconstruction of four swing bridges and approaches at the Isle of Dogs—

The Thames Ironworks and Ship Building Company, Limited	£	s.	d.
Mr. A. Thorne	55,021	11	2
The Phoenix Iron Company	57,013	18	10
Sir W. Arrol & Company	57,053	9	2
Messrs. Woodhouse & Rawson	58,148	9	10
Messrs. A. Handyside	61,381	1	0
	63,863	3	0

The tender of the Thames Iron Works and Ship Building Company was accompanied by a letter in which the Company stated that in the event of their tender being favourable they would require to come to a clearer understanding with reference to certain clauses in the contract. The letter from the Company is not very definite, but we have not asked for further information, as with one slight exception we are not prepared to advise the Council to make any alteration in the contract. The exception to which we refer is that in the arbitration clause words might be added to the effect that in the event of Mr. Binnie ceasing to act as Engineer of the Council, an arbitrator should be appointed by the President of the Institution of Civil Engineers. This arrangement was made in the case of the Barking-road Bridge, and we see no objection to it. We are prepared to recommend the acceptance of the tender of the Thames Iron Works Co., subject only to the foregoing alteration of the contract. We recommend—

(a) That in the arbitration clause in the contract words be added to the effect that in the event of Mr. Binnie ceasing to act as Engineer of the Council an arbitrator shall be appointed by the President of the Institution of Civil Engineers.

(b) That, subject to such alteration of the contract, and subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, the lowest tender, that of the Thames Iron Works and Ship Building Company, Limited, amounting to 55,021*l.* 11*s.* 2*d.*, be accepted, and that the solicitor do prepare the contract."

The Boundary-street Scheme.—The Public Health and Housing Committee reported that the Secretary of State had approved the plan for the reconstruction of the Boundary-street area, and had sanctioned the reduction in the number of persons to be rehoused from 5,100 to 4,700. Permission was also given to the Council itself to erect the dwellings for the working classes on section A of the area.

Hughes-fields, Deptford, Improvement Scheme.

The same committee also reported as follows, the recommendation being agreed to:—

"In accordance with the resolution of the Council of the 20th of December last, application was made to the Home Secretary for permission for the Council itself to erect dwellings on the vacant plots on the Hughes-fields site. The Home Secretary granted the application, and we now submit the drawings and specification for the foundations of the buildings proposed to be erected on plots 2 and 3. The buildings will be cottage dwellings two stories in height, to accommodate 192 persons, and are similar in design to those to be erected on plots 6, 7, and 8, the foundations for which are now being proceeded with by the Works department. The estimated cost of the foundations (plots 2 and 3) is 850*l.* The plans for the buildings are in progress, and will be submitted in due course. We have carefully considered the estimate of the cost of the buildings, and are satisfied that the Council's resolution of the 21st March last, requiring a return of 3 per cent. on the Council's building operations will be complied with. It is desirable that the foundations should be put in hand at once, and that the work should be executed by the Works department. We recommend—

'That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, the foundations of the dwellings to be erected on plots 2 and 3 in connexion with the Hughes-fields, Deptford, scheme, and the preparation of the plots, be executed by the Council without the intervention of a contractor, and that the specification and estimate be referred to the Works Committee for that purpose."

Cottage Dwellings, Goldsmith-row Site.—The same committee also reported that the Home Secretary had also signified his approval of the plans for two-story cottage dwellings on the Goldsmith-row site to accommodate 144 persons.

Extras, Parker-street Lodging House.—The Public Health and Housing Committee also reported as follows with regard to the Parker-street Lodging House, their recommendation, after considerable discussion, being agreed to:—

"We have had under consideration a statement from Messrs. Gibson & Russell, the architects of the Parker-street lodging-house, of extras and omissions on the building contract, showing a net sum of 1,053*l.* 13*s.* 2*d.* due to the builders over and above the contract price, viz., 14,300*l.* This result is due partly to additions which were found necessary as the work progressed, and which were mostly unavoidable, but the two items which have added materially to the extra cost are (1) variation of foundations, 276*l.* 2*s.* 10*d.*; and (2) variation on fire-proof floors and constructional ironwork throughout, 203*l.* 14*s.* 3*d.* The extra on the foundations is explained by the fact that much extra work was entailed by the necessary removal of old brick sewers which were discovered in digging the foundations. This could hardly have been foreseen, and no explanation is necessary on this point. With regard, however, to the amount, 203*l.* 14*s.* 3*d.*, due on variation on fire-proof floors and constructional ironwork, some remarks are due. When the original specification was being discussed, with a view to ascertaining what saving could be made in the cost of the building, it was pointed out by the architects that by the substitution of Messrs. Holloway's floor of steel joists and roof for Messrs. Homan & Rodgers' floor and roof, a considerable saving, viz.: from 200*l.* to 300*l.*, would be made. On this point we understand the builders were consulted, and they stated that the proposed deviations from the specification would be a saving. We were therefore surprised to learn this has not been done. We have carefully gone into the matter with the architects, who state that they consulted Messrs. Holloway Brothers, and were given to understand that the alteration would effect a saving. The architects further state that the builders admit having advised the use of an ordinary concrete floor and steel joists for that specified, but consider that in working to the architects' revised drawings and having the work measured up by the Council's surveyors at completion they are absolved from any responsibility as to cost. The builders are not prepared to make any reduction, and as the quantity surveyors and architects have duly certified the account we see no alternative but to recommend—

'That, subject to an estimate to be submitted by the Finance Committee in accordance with the statute, the account of Messrs. Holloway Brothers for extras on the contract for erecting the Parker-street lodging-house, amounting to 1,053*l.* 13*s.* 2*d.*, be paid."

Appointment of a District Surveyor.—Mr. Parsons, district surveyor for Lambeth (south) and part of Camberwell, who was dismissed by the Council in January last, having been convicted for travelling on the railway without having paid his fare, and who afterwards brought an action against the Council in the Chancery Division, in which Mr. Justice Stirling decided that he was not guilty of the offence charged, was on the recommendation of the Building Act Committee, reappointed to his former position.

The Thames Conservancy.—The Chairman announced that the ballot for the election of three members to represent the Council on the Thames

Conservancy Board had resulted in the election of the following members:—Mr. Charles Harrison, Mr. Basset Hopkins, and Mr. M'Dougall. The Council adjourned shortly before seven.

Books.

Handbook on the Steam-Engine. By HERRMAN HAEDER and H. H. P. POWLES. London: Crosby Lockwood & Son.

THIS volume forms the English edition of a handbook upon the steam-engine, originally written in German by Herr Herman Haeder, for the use of engine-makers, mechanical draughtsmen, engineering students, and users of steam power, with especial reference to small and medium-sized engines, and has been translated by H. Powles, with considerable additions and alterations from the second German edition, and forms a most compact and clearly-written work, free from tautology. The illustrations are well produced, and the tables of dimensions recording actual practice are most useful guides for detail work.

In 1685 an engine was made to prove the use of steam as a motive power. Watt's first engine was built in 1768, since which date various types of engines have been forthcoming. Some in favour of vertical engines urge that in horizontal engines the cylinder is apt to wear oval. Crank shafts were usually made of wrought-iron, but now are almost always of mild steel. The balance weight should act in the same plane in which the parts to be balanced move; hence, it is wrong to balance the crank, connecting-rod, piston, and crosshead by applying the balance-weight to the fly-wheel. The heating of bearings may proceed from the construction, maintenance, or attention, or rather want of attention, whilst at work, and even when at rest. To prevent hot bearings, the brasses should always be bored out a fraction larger than the measured diameter of the shaft, which runs in them. A tight fit is not necessarily a good fit. With crank pins the heating is not always caused by want of truth in the form of the pin, but probably from the pin not being perfectly in line with the crank shaft. Hot bearings cost a factory considerable sums of money. Lubrication is a necessity; a simple oil-hole in a long bearing is totally inadequate.

Such are some among the many practical hints contained in this book, which resembles an improver's note-book, but it is to be regretted that the index at the end of the volume is merely an alphabetical table of contents. So many points are noted in the letterpress that the index deserves to be more in detail and the matter referred to under more than one heading. Reference to pages by both subject and name would have rendered the index to this practical volume more useful.

Engineering Materials. By EDWARD C. R. MARKS. London: John Heywood.

THIS small volume purports to be a revised series of articles upon mechanical engineering materials, which originally appeared in *The Practical Engineer*, and has been compiled by the Lecturer on Engineering at the Birmingham Municipal Technical School, to assist his own and other pupils. In dealing with the properties and treatment of materials in mechanical work, he does not enter into detail upon the principles of any manufacturing process, such as may be found in any book on metallurgy, but gives practical hints as to factors of safety, the strength of copper, brass, bronze, and bearing metals; the transmission of power by belts, and working of spur and toothed gearing, also the mode of workshop tests for unit sections of iron and steel. The book contains just such information as a practical mechanic who had received a training at a good technical school would be able to impart, and so far will prove useful to mechanical students.

OPENING OF AN EXHIBITION AT HULL.—An exhibition of industrial arts and manufactures was opened in the Artillery Barracks at Hull on the 7th inst., by the Mayor of the Borough (Ald. George Hall). Mr. Philip Shrapnel has had the organisation of the exhibition, and the space has been largely taken up by local tradesmen. The large hall of the building is divided into avenues for the display of goods, the repository shed is set apart for machinery in motion, and the gun-room for the show of pictures and other articles appertaining more particularly to high art. From the manager it was ascertained that the object the promoters have in view is the fostering of a healthy competition.

Correspondence.

To the Editor of THE BUILDER.

RHINE CHURCHES REVISITED.

SIR,—To one who revisits a scene or an object which at one time moved his admiration or afforded some example of study or reflection only to find it altered or destroyed, the mere disappointment, though great, can be supported with equanimity; but when this object is of superior artistic worth, a great relic of antiquity, an historical landmark, and an example of a far-off period of religious zeal, disappointment turns to disgust, and regret to anger, and one is apt to give vent to one's feelings by crying out to one's fellow artists, and relieve one's feelings by writing to the *Builder*.

Such has been my experience lately in revisiting the scene of some of my early studies on the Rhine; * such objects as churches and ecclesiastical buildings, which when first seen and studied were almost unrepaid, in much of their pristine glory, adorned by the hand of time and most certainly un-"restored."

That some reparation was needed there could be no doubt, in many cases, if the buildings were to remain as visible "objets d'art" at all, or if the historical monument was not to lapse into a heap of useless debris covering the ground and inviting ignorant local authorities to clear away rubbish what was of extreme worth as architectural art.

Fully and most distinctly admitting this, and knowing well how difficult it is to deal with dilapidated buildings so as, on the one hand, not to destroy features of priceless value, but to make permanent the interest which seems passing away even as one enjoys it, and on the other to preserve every stone which has any mark of real date upon it and every relic of handiwork and skill without identifying modern craftsmanship with the old not replacing yesterday's work with to-day's, I yet must protest as vigorously as I am able against what is now going on, and alas! what has been done recently under the name of *restoration* in this part of Germany. As far as I have seen, and I fear this is only a sample of what is being done elsewhere, the grand old Romanesque churches, which have been spared by the wars and tumults raging around them or in their midst for hundreds of years, and which time has dealt tenderly, or even lovingly, with in bestowing those tints which age alone can give to old buildings and carved work, have now been repaired and improved beyond all knowledge, and, indeed, beyond any sort of interest in the work as completed, leaving smooth, new surfaces in place of weather-worn touches, and clean, round, faultlessly regular arches, pediments, and spilets, where there used to be those broken lines of picturesque wear and tear, and the colour of stones and variable jointings which speak out history and often proclaim the architectural attainments, if not the names of those who built them, as if they had been engraved in the walls.

Instances of this are specially to be noted at Coblenz, Mainz, Bonn, Cologne, &c.

To St. Castor at Coblenz? so much has been done that all the spirit of the work on the exterior is destroyed; no one cares any more to see or sketch it, and it is no good for study, a paper model or a photograph showing as much as a visit to the spot. Here the last portion of the restoration work was being pushed on (it seemed hastily, as the Emperor's visit was approaching), viz., the rebuilding of the top of the last one of the turrets at the side of the eastern apse, all else being apparently renewed, not repaired. A hoarding around the church contained many of the old stones and stonework, which I venture to say might well have been re-used even if they need have been removed from their original setting at all; certainly one would have rejoiced to have had some of these old stones in a museum for study, and if good enough for this surely they might have been retained in their original position.

Now St. Castor dates from the ninth century, and is a special example of the wonderful development of pre-Gothic art and the most delightful form of Romanesque art.

Again at Cologne, especially St. Aposteln, work had been done which took all pleasure out of the building, and at St. Pantaleon made it appear as of date with some surrounding barracks.

* Referring to a Prize Paper read at the Inst. Brit. Architects, April, 1855, and published in their Volume of Papers read for the Session 1854-55.

† Original consecration recorded as in 836 A.D.

Exceptions, of course, must be made in some cases for certain parts, but even where the old work has been retained in form it has been robbed of its ancient surface and colour by new decorations, done to the death, or false jointings. The sooner this comes to grief the better. Our only hope is in old time again, that to future generations he will kindly show some of the really ancient forms by sweeping away modern impertinences.

At Mainz, happily, at present things have not gone too far, but they are progressing. The glorious picturesqueness of the prince of Rhine Cathedrals is not gone yet; the galleries of the apses remain, and the wonderful central dome and spire; but still restoration is coming, and one must admit there is some reason for some reparation. Of course, one notices that much of the tracery of the cloisters and elsewhere really wants kindly care and attention simply to preserve them. But, alas! one fears that this will be the excuse for improving it all out of knowledge, unless some much more reverent hand is laid on Mainz than has been elsewhere.

Worst of all at Bonn, a church of great interest with much remaining of the twelfth and thirteenth centuries, where at least under the eye of the university, one might hope for respect towards the work of our forefathers. Men, inside and out, in all parts of the church, are *tooling down*, with sharp chisels and hammers to straight edges carefully applied, all bases and mouldings, whilst the caps and shafts and wall surfaces have been rubbed and smoothed and treated in the same way on the interior for the purpose of painting, gilding, and colouring, and outside it would seem simply for smoothing's sake. Three men were at the west, two in the southern, and two or three elsewhere, and outside, many in the gallery over the south and eastern parts of the church, and no one architecturally learned need be told that these external galleries, with their delightful little shafts, caps, and arches, are one of the chief and universal features and adornments of the Romanesque style.

Many other churches not visited seemed at a distance too new and clean to be the ancient work, and apparently had undergone this same wholesale process of reproduction.

One trembles for Aix-la-Chapelle,* the glorious shrine of Carolingian memories and renowned, happily at present somewhat neglected in its faded and dignified beauty, and other such fanes of architectural glory.

But here there were hoardings in the cloisters within which ominous sounds and signs of workmen's hammers were heard, and over which were seen traceries, vaultings, looking very new and smooth, close to others in a semi-ruinous condition.

Now one fears greatly for what is about to happen, and trembles lest the departure of the great charm of those grand old buildings dating from the tenth century should be close at hand. I counsel all young architects who may think of flying past on their way to other and more distant fields of study to stop at Aix, not an hour only, but take time to draw and measure and sketch, if it be only the marvellous ironwork balcony round the upper gallery of the dome, and so like that of Roman temples that it alone goes to justify the term of Romanesque.

C. FORSTER HAYWARD.

"THE MANX CROSSES."

SIR,—It is clear that Mr. J. R. Allen and Mr. J. H. Spencer have not given any consideration to what I have written about the crosses. Mr. Allen also writes without an accurate knowledge of the crosses.

The "many very misleading statements" about the crosses which he has discovered in my communication, and which he has endeavoured to correct, have a closer relation to the facts than have his corrections.

It is impossible to classify the crosses of the island into "distinct types" related to the crosses of different archaeological areas, without ignoring the natural elements of art which exist in them as in all artistic work, without ignoring the evidences they present of their common and personal origin—the remarkable unity of forms and fancies, of execution and sentiment, which certainly exist among them all.

I am not responsible for the statement that Gaut.

The "absurd mistake" has not been made by me. The group is almost as I have shown it. I went to Kirk Michael specially to see Malumkun's Cross, and to confirm to myself what I was already sure of by heart. There is no T-headed key for tuning the strings of the harp; the lower part of an animal

* Erected by Charlemagne, 802 A.D., on an older foundation.

is there, so that were it looked at with half an eye it could be seen.

Further, on the Manx crosses an object is always shown by relief, never by an incision such as the T-shape is.

AD. KNOX.

TAR FOR TIMBER AND PANEL.

SIR,—Unless "Architect" should wish for really black timbers, I should advise him to use the carbolinum made by Peters, Bartsch, & Co., of Derby. By its great power of penetration it is a far better preservative than any preparation of mere tar, and very little more costly. It leaves the surface of the wood darkened but not covered with black. It may be renewed without having to clean off the old. It should be put on hot, in two coats. There must be nothing under it in the shape of oil or of soft putty, nor of cement, or plaster which is not first proper set and dried out.

WILLIAM WHITE, F.S.A.

MESSRS. ERARD'S NEW ROOMS.

SIR,—My attention has been drawn to a paragraph in your issue of the 7th inst. about Messrs. Erard's new premises.

I beg to say the concert-hall (to hold 1,200) was abandoned owing to the action of the County Council. The new building will contain show-rooms, offices for the staff, and a suite of apartments on the top floor.

PERCY G. STONE.

The Student's Column.

GEOLOGY.—XVI.

THE ORIGIN OF SCENERY.

THE present configuration of the surface of the land is due to the action of what are called the "agents of denudation," both in their destructive and reconstructive capacities. Whether rocks exist as enormous beds of strata, or as masses of igneous origin, they are very unequal in point of hardness, and differ widely in regard to their power of resisting decomposition. The denuding agents also are of unequal power, and have not the same force in one locality as in another; nevertheless, whether on a large scale or a small one, they are continually waging war with the rocks, endeavouring to destroy and remove them from the face of the earth. This conflict has gone on since the time of the formation of the earliest rocks at the surface, and has exerted material influence in determining the present physical features. During it, whole formations of vast thickness and extent have been utterly destroyed, whilst nearly all the old rocks engaged in the strife have been maimed and mutilated. These latter have had a veritable struggle for existence, though whether the law of the survival of the fittest is vindicated by what remains is a matter of opinion. The rocks, however, would unquestionably have been routed long ago and razed to a dead level had they not possessed a powerful subterranean ally which elevated them above that level as rapidly as they were worn away, or depressed by their enemies. The underground forces, as we know from what has been said in previous articles, have not acted equally, or evenly; they seem to have concentrated their power of elevating on certain points, and along definite lines, whilst they have not hesitated to withdraw their support, allowing the land to sink in certain regions, in order that full strength may be available in resisting the onslaught on other districts. In a few regions the subterranean powers have boldly endeavoured to assert their superiority by elevating enormous rock masses to great heights on the earth's surface; but the agents of denudation, ever on the alert, have called forth special methods of attack in such situations, and there the struggle is, at the present day, short and sharp, whilst great excesses are committed on both sides.

Agents of Denudation.—We have described the principal rocks found at the earth's surface; we have also said something concerning the nature of the subterranean forces; but we have not yet alluded to their opponents—the various instruments called "agents of denudation," and their methods of action, let us therefore now do so. The denuding agents may be divided into two groups; those which act (1) Chemically, and (2) Mechanically. Certain of them are endowed with power to act in the dual capacity.

As under certain circumstances becomes a powerful denuding agent, and is at all times ready to assist its allies. When heated by the sun and then suddenly cooled as the latter disappears beneath the horizon, its effects on rocks are very marked, especially in countries where great range

in diurnal temperature takes place. Dr. Livingstone found in Central Africa, for instance, that surfaces of rock which during the day were heated up to 137 deg. Fahr., cooled so rapidly by radiation at night, that, unable to sustain the strain of contraction, they split and threw off sharp angular fragments, from a few ounces to 100 lbs. or 200 lbs. in weight. On a journey a few years ago through the mountainous tracts of Algeria in the summer time, we frequently noticed that the surfaces of the rocks were crumbled to dust from the same cause, which the hot wind removed in clouds from time to time, and during the evening large slabs would become detached, rebounding from ledge to ledge down the mountain side. Moving air, or wind, has also considerable power; it takes up particles of sharp sand, and hurling them against solid rocks, chips small particles off the latter, and where possible polishes them. The destructive action of this sand-blast is well marked in parts of Egypt, New Zealand, and the United States. The geological effects of wind in connexion with the origin of scenery are well exemplified in the formation of sand-dunes and æolian rocks generally.

Rain acts in a dual capacity as a denuding agent. Chemically it disintegrates rocks, forming soils, and sinking into the ground is instrumental in excavating caves and widening fissures. Mechanically it shifts along loose materials, and often makes use of them for abrading purposes. By itself rain has very little power to do chemical work. In descending from the clouds, however, it takes up small proportions of air, which contains carbonic acid and other ingredients enabling it to accomplish the chemical changes upon rocks and soils alluded to. It is no part of our present purpose to describe the actual processes by which these changes are brought about, but in the aggregate they produce the most widespread effects in sculpturing the land. The general result may be considerably modified, depending upon the nature of the rocks acted upon. Thus, in a limestone area the chemical effect of rain is most marked, as is evinced by the enormous quantities of carbonate of lime found in the waters coming from such districts, and which has been directly derived from the decay of limestones. On the other hand, rain has very little chemical effect as a denuding agent in districts where slate, schist, and similar rocks abound; we have noticed in parts of North Wales, for example, that the strike made during the time when that country supported glaciers are apparently as fresh as when they were first scratched on the surface of the rocks, thousands of years ago.

Rain-water exerts considerable mechanical action where it derives sufficient velocity on sloping land or the precipitous mountain-side. Its power to do work in this direction is, of course, entirely governed by concomitant circumstances. In those parts where the rocks are readily disintegrated, it finds most work to do in washing away the detached particles, and in taking them down the hill-side by the little channels it has already carved out, to the nearest river. A fresh face of rock to be acted upon is thus exposed.

Rivers and Streams not only do an enormous amount of transporting work, but are great factors, in conjunction with rain runlets, in excavating valleys. The surface configuration of nearly the whole of southern, south-eastern, eastern, north-eastern, and central England has been brought about by the combined action of rain and rivers.

Ice, also, is responsible for a large amount of denudation. It acts as a disintegrator in forcing pieces of rock asunder, thus loosening them from their parent mass. This action may be briefly described as follows:—Small cracks, or microscopic holes in rocks at the surface, frequently contain water which, on freezing, expands and exerts tremendous pressure, causing the fracture, or hole, to enlarge, or crack further, thus breaking up the surface of the rock, and re-cementing it for the time being with ice. When the ice melts, pieces of the rock naturally become detached, and the whole disintegrates.

Glaciers are great excavators in solid rocks. At the present day they are confined to the frigid zones, and to high mountainous areas in temperate and tropical climates; but there was a time not long since, geologically, when this country supported several large glaciers, and many surface features in North Wales, the Lake District, and in mountainous areas in Scotland, are the direct effects of glacial action. There is evidence that the whole of England was recently covered by an ice-cap similar to that now found

in Greenland. As to how far the soft rocks on the surface of this country have been modified in their appearance by the planing action of such an ice-sheet it is impossible to say; but many of the valleys in North Wales and Scotland have been deeply excavated by glaciers. The action of the latter in this respect may thus be summarised. These rivers of ice are frequently hundreds of feet in thickness, and are rent from top to bottom by large cracks. Pieces of stone fall on the glacier from the rocks along its flanks, and a large quantity of these find their way by the cracks or otherwise, to the bottom. As the glacier slowly moves, the hard pieces of stone at its base are dragged along, filing off irregularities, and scoring its rocky channel with small furrows, or striae. This action, continued over a long period, gradually excavates the bed of the ice river to a great depth. Such picturesque valleys as that of Nantfrancon, near Snowdon, owe, if not their origin, at least their present shape, to the power of glaciers.

OBITUARY.

MR. FORD MADOX BROWN.—Mr. Ford Madox Brown, the artist, died on the 6th inst. at his residence, St. Edmund's-terrace, Regent's-park. The deceased was born at Calais, of English parents, in 1821, and was educated on the Continent. It was not till 1844 that he took a decided step as an exhibitor in England by sending two cartoons to Westminster Hall. Shortly after this he visited Italy. At the Royal Academy in 1851 he produced his large picture of "Chaucer at the Court of Edward the Third," which had been several years in progress. This picture, among those selected by Government for the Paris Exhibition of 1855, received the Liverpool prize of 50*l.* in 1858. After 1852, Mr. Brown, though exhibiting at times at Liverpool, Edinburgh and other places, did not again come before the London public till 1865, when he opened an exhibition in Piccadilly of fifty pictures, and as many cartoons and sketches. He subsequently painted many well-known pictures, and his last oil picture of importance is "Wyclif on Trial at Old St. Paul's," a composition including more than 100 figures, now introduced as one of the fresco series on which he was engaged for the past eleven years in the Manchester Town Hall. Mr. Ford Madox Brown frequently lectured and wrote on art.

GENERAL BUILDING NEWS.

NEW MOTHER LODGE AT KILWINNING, Ayrshire.—The New Mother Lodge at Kilwinning was opened recently by the Hon. Thomas Cochrane, M.P., Grand Master of the Lodge. The foundation-stone of the new building was laid in September last. It has a frontage to Main-street, and the style adopted is that of the Scottish Renaissance. An arched doorway, forming the main entrance, occupies one side of the frontage; the main committee-room; a double window lighting the main committee-room; over the door and windows moulded trusses carry a stone balcony and balustrade, which run along the whole frontage, and also carry a projecting five-light oriel. Above this is a deep-pitched gable, with moulded steps, and across the gable is carried a broad sculptured band bearing the words "Mother Lodge" on the background of thistle enrichment. The front is of red sandstone from Mauchline Quarry, and the roofs are covered with a pale green slate, finished at the apex with red tiling. Entering the porch, a tiled vestibule leads to the inner staircase hall, from which the lodge-room is entered, and a wide square staircase gives access to the upper floor. The lodge-room, 42 ft. by 25 ft., with a coned ceiling, and partly open-timber roof, is entirely sky-lighted. On the ground floor, there will be a committee-room and other accommodation. On the upper floor are two waiting-rooms. The building has been erected from designs by Mr. John B. Wilson, A.R.I.B.A., under the supervision of Mr. John Armour, junr., Irvine, resident architect.

ADDITIONS, ST. CATHARINE'S CHURCH, CANTON, Ayrshire.—The additions which have been made to the church of St. Catharine, King's-road, Cardiff, have just been consecrated. The edifice was commenced several years ago, but lack of funds prevented its completion; and although considerable improvements and extensions have been made, a good deal of work still remains to be done. The new portions of the building consist of a chancel 40 ft. long and 24 ft. wide, a south aisle organ-chamber, and choir and priests' vestries; the work being in the Early Decorated style. The floor is laid with encaustic tiles, and coloured bricks, relieved by dressings of stone, have been used for the interior of the building. As yet the furnishings of the church are not fixed, and the stalls are only temporary in character. The windows are adorned with glass of an antique pattern, by Savell, of London. About 2,000*l.* is the estimated cost of the work already done, and another portion of the nave at the west end of the church is to be added when funds allow. The church when completed will afford sitting accommodation for over 800, and the extensions

have been carried out from the designs of Messrs. Kempton & Fowler, architects, Cardiff; the contractor being Mr. W. Symonds, of Canton.

UNIVERSITY EXTENSION COLLEGE, READING.—The fifteenth-century building originally used as the dormitory of the Hospitium of St. John attached to Reading Abbey, restored some three years ago by the Corporation of Reading, to whom it belongs, and adapted to the purposes of the College, having been found inadequate as to size on account of the great increase in the number of students, it became necessary to provide additional accommodation, and with great liberality and public spirit the Chairman of the Council, Mr. Herbert Sutton, to whom the college is under great obligations, bought the vicarage of St. Lawrence, which adjoins the Hospitium, at a cost of 4,500*l.*, and has undertaken to convey the property to the college at any time during the next three years for 4,000*l.* Pending the accumulation of this fund, he has let the house to the college at a nominal rent. In order to adapt the vicarage to college purposes, and to connect it with the Hospitium, some considerable alterations and improvements have been made in the internal arrangements of the buildings, and there have been added a corridor, a new Biological Theatre, and laboratory; a new physical laboratory and work-shops; a common room for the staff; and lavatories and retiring rooms. Some further addition, as a memorial to Mr. W. J. Palmer, the first President of the College, is also intended, for which a fund is being raised. The works have been carried out by Mr. E. MacCarthy Fitt, builder, off Reading, and Mr. S. Slingsby Stallwood, of Reading, is the architect.

NEW CHURCH FOR LIVEREDGE, YORKSHIRE.—The little church of St. Barnabas, High-ton, Liveredge, was consecrated by the Lord Bishop of the diocese a short time since. The contracts were let for 3,571*l.*, in addition to which about 500*l.* is needed for a boundary wall, furniture, &c. The church will seat about 380 persons. The plan comprises a south entrance porch, 10 ft. by 8 ft.; a nave and aisles 56 ft. 6 in. long, the former being 20 ft. wide, and the aisle 9 ft. 6 in. wide; and a north transept 15 ft. long by 12 ft. 6 in. wide. In continuation eastward of the south aisles is the organ chamber, 15 ft. 6 in. by 10 ft. 6 in. The chancel is 28 ft. 6 in. long by 20 ft. wide, having open seats with carved ends. To the north of the chancel are separate vestries for the clergy and choir, fitted with all requirements. The roofs are constructed of open timber work, stained dark, and the seats, which are cut from pitch-pine, are stained a rather lighter tint. The pulpit and font are of St. Michael's Mount stone. The architect is Mr. W. Swindell Barber, of Liveredge. The contractors were:—Messrs. W. & J. Milner, Mirfield, masons; W. Halliwell, Brighouse, carpenter and joiner; J. Naylor & Son, Halifax, plumbers and glaziers; hot and cold water engineers; Rushworth & Firth, Halifax, slaters and plasterers; S. Kendall, Huddersfield, painter and stainer.

THE EDINBURGH MERCHANT COMPANY'S SCHOOLS.—The secondary schools of the Edinburgh Merchant Company were opened on the 2nd inst. During the vacation considerable structural alterations have been carried out on George Watson's College and George Square Ladies' College. Various plans were considered, and various sites talked of, but finally it was resolved to erect two new wings to the old school, and to rearrange the institution so as to have the elementary department in one of these wings. That work has now been completed, and a new gymnasium has also been built at the back of the existing building. Two new staircases connect the main building with the wings, in each of which there are six large class-rooms and three small ones. The cost of the additions amounts to between 10,000*l.* and 12,000*l.* Upon George Watson's Ladies' College extensive improvements have also been completed. Last year the Governors acquired a house to the east of their property, and on the site they erected a new wing. This year they have erected, in lieu of the old building on the west side of the school, a new wing, corresponding to that on the east, but of somewhat larger dimensions. Roughly speaking, the cost will be about 5,000*l.* The work has been carried out by Messrs M'Gibbon & Ross, architects, Edinburgh.

GASWORKS, ANCOATS.—The contract for the Carbonic Acid Gasworks, to be erected in Pollard-street, Ancoats, Manchester, has been let to Mr. James Byrom, contractor, Woolfold, Bury, his estimate being 2,715*l.* 3*l.* 9*d.* Messrs. Maxwell & Tukey, of Manchester, are the architects for the building.

NEW CHURCH, GATESHEAD.—The foundation-stone of the new church of St. Aidan, which is being erected at Bank-street, Gateshead, in memory of the late Bishop Lightfoot, was laid on the 7th inst. by the Bishop of Durham. The new church will accommodate about 500 people. Being built on a slope, the schools are placed beneath the church, and will accommodate about 400 children. The cost of the buildings is 5,000*l.* The architect is Mr. Stephen Piper, the contractors Messrs. Haswell & Waugh, Gateshead, and the clerk of works Mr. Richley.

MISSION HALL, BELFAST.—The foundation-stone of the Beechpark Mission Hall new building, which is being erected in Hillview-street, Oldpark-road, Belfast, was laid on the 7th inst. The new hall,

which will have frontages to three streets, will have high-pitched gables and projecting barge-boards. The superstructure will be built out of selected perforated brick. The main side walls will be about 20 ft. in height, and the height of the interior from floor to ceiling will be 28 ft. White stone dressings will be used throughout. The roof is to be surmounted with a Bargie's ventilator, with an ornamental canopy over the same. The interior of the building will comprise a lecture-hall, a reading-room, the necessary sanitary apartments, a cloak-room and a kitchen, and there are to be two galleries. The style of the building will be Gothic. The builders are Messrs. Milligan & M'Cartney, and the architect is Mr. John Fraser, C.E., of the firm of Messrs. Fraser & Son.

THE NEW TECHNICAL SCHOOL, BIRMINGHAM.—The tender of Messrs. W. Sapote & Sons for the work of erecting the new Technical School in Suffolk-street for the sum of 47,489*l.* has been accepted.

FINE ART GALLERY, PECKHAM-ROAD.—On Monday the Prince of Wales opened the South London Fine Art Gallery, which is situated in the Peckham-road. The building includes picture galleries, a lecture room, and a library. It has been designed by Mr. Ernest George, and has been built by Messrs. Prestige & Co., Grosvenor-road, Piccadilly. The picture gallery skylights have been glazed on Messrs. W. E. Rendle & Co.'s patent invincible system.

ALTERATIONS TO THE WEST HAM PARISH CHURCH.—The parish church of West Ham, which has undergone considerable alteration and improvement, was re-opened recently. At various periods the church has undergone alteration and restoration. The latest work was carried out through the exertions of the Rev. A. R. Pelly, the vicar. This work included the removal of the one remaining gallery in the south aisle, the cleaning of the interior, the addition of choir and clergy vestries in place of the old vestry, and the restoration of the south aisle. The work has been carried out by Mr. J. Smith, of Witham, under the supervision of Mr. C. C. Winnill, the architect. The loss of seats consequent upon the removal of the old gallery has been compensated for by utilising and seating the old vestry and other portions of the church hitherto unoccupied, 200 new seats having been thereby provided. The lighting of the nave and aisles has been improved; new stone windows have been substituted for the old ones in the south aisle; and the removal of the gallery has added to the natural light in the body of the church. The new vestries built at the south-west corner of the church are of Kentish rag with dressed stone facings. The organ has also been restored and partially rebuilt.

PROPOSED NEW SCHOOL, PARTICK, LANARKSHIRE.—On the 5th inst., at the Partick Dean of Guild Court, an application was made by the Govan Parish School Board, for leave to erect a new school. The application was granted. The building will consist of four stories, and will accommodate 1,500 scholars, the cost being estimated at from 18,000*l.* to 20,000*l.* On the basement will be the janitor's house, boys' workshops, heating and engine rooms, &c. In connexion with the school there will be a laundry. Messrs. H. B. & W. Steel & Balfour, Glasgow, are the architects.

CENTRAL LIBRARY, CAMBERWELL.—On Monday, the Prince of Wales opened the Central Library, Peckham-road, Camberwell. The new building is in the Renaissance style, and has been designed by Mr. R. P. Whellock, of Finsbury Pavement, E.C., the builder being Mr. J. O. Richardson, Peckham. Externally the material used is red brick and Portland-stone, the arched porch being supported by Ionic columns of polished Cornish granite, while granite steps lead to the vestibule. The main corridor is 10 ft. wide, partitioned with arched grey granite columns, the lending library and news room being to the right and left of the corridors. The cost of the building is about 12,000*l.* At the back of the building is a public garden and recreation-ground.

SANITARY AND ENGINEERING NEWS.

NEW RESERVOIR, CARDIFF.—A meeting of the Cardiff Waterworks Committee was held at the Town-hall on the 6th inst., when Alderman David Jones presided. A report of the cost and dimensions of the No. 1 Reservoir in the Taff Vaw Valley was submitted by Mr. J. A. B. Williams, the waterworks engineer. The length from one side of the embankment to the other would be 1,000 ft., and 1,300 ft. from one end to the other. From the bed of the river to the top would be a distance of 63 ft., and the greatest depth of the trench would be 70 ft. The height from the foundation to the top of the valley would be 114 ft. The greatest width at the base would be 1,400 ft., and the width of the top would be 30 ft. The cost was estimated at 198,723*l.* This sum would, however, include the making of a railway seven miles and a-half long. The report was adopted.

SEWAGE DISPOSAL WORKS, ALNWICK, NORTHUMBRIA.—A public inquiry was held on the 10th inst. at Alnwick, by Mr. F. H. Tulloch, A.M. Inst. C.E., Local Government Board Inspector, with reference to an application by the Alnwick and Canongate Local Board of Health for sanction

to borrow 4,570*l.* for proposed high level intercepting and relief main sewers and sewerage disposal works, and 350*l.* for private street improvement works, in accordance with the plans, &c., prepared by Mr. Geoffrey Wilson, Town Surveyor, and adopted by the Local Board.

NEW BRIDGE, CAMBUSLANG.—The new bridge over the Clyde at Cambuslang has been opened for traffic. It has been built from designs by Messrs. Crouch & Hogg, C.E. The bridge consists of three lattice girder spans of 90 ft. each, with masonry piers founded on cylinders sunk into the bed of the river. In connexion with the bridge there are about three-quarters of a mile of new roads forming direct communication between Cambuslang and Tollcross. The total cost of the works has been about 10,000*l.* The contractors for the bridge and new roads were Messrs. John Paton & Co.

STAINED GLASS AND DECORATION.

WINDOW, PARISH CHURCH, BARNES.—A three-light east window was recently unveiled at the Parish Church, Barnes, the subjects being the Crucifixion in the central light, the Blessed Virgin and St. John in the left and right lights respectively. The figures are treated very conventionally in antique glass, with full tones upon a background of gold and yellow, the draperies and canopies being diapered after the manner of old English glass of the fourteenth and fifteenth centuries. The window was designed and executed by Messrs. Percy Dacomb & Co., London.

NEW WINDOW AT THE PARISH CHURCH, ATHELHAMPTON.—A new window has just been dedicated at the parish church of Athelhampton, Dorsetshire. This completes the chancel windows, which are now all filled with stained glass. The latest addition represents the archangel St. Raphael, the work being executed at the studio of Messrs. Heaton & Butler, of London.

FOREIGN AND COLONIAL.

FRANCE.—Mr. Evans, an American residing in Paris, has given a large house belonging to him at Passy to be transformed into a boarding-house for American young ladies coming to Paris for the study of art. The late Dr. Charcot has left to the Louvre a curious album of drawings and water-colours by Delacroix, made in the course of a tour in Morocco, in which the great painter had embodied his notes and impressions of the country.

At the Ecole des Beaux-Arts an exhibition has been opened of the stained glass designs submitted in competition for the windows of the Cathedral at Orleans, in which are to be represented the principal episodes in the life of Joan of Arc. There are twelve competitors, among whom those of M. Albert Maignan and M. Champigneulle are most conspicuous. For excellence in the "Prix Jarry" founded in favour of a "Pensionnaire" architect returning from Rome has been awarded to M. Chedanne, who obtained the Prix de Rome in 1887. A new Maternity hospital is shortly to be built in Paris, on part of the site of the Hôpital St. Antoine. It will have a special entrance in the Rue de Chaligny. The town of Lyons is about to build a hospital for convalescents, thanks to the liberality of an inhabitant of the town who has left a sum of 900,000*fr.* for the purpose. In the course of the foundation work for the new Mairie of the Xth Arrondissement (Paris) the workmen have discovered the arch of a subterranean bridge near the corner of the Rue du Château d'Eau and Rue du Faubourg Saint-Martin. The bridge must have formerly crossed a stream indicated in the plan of Turgot (1730), and known under the name of the river "de la grange batelière," or "de Menilmontant." Traces of this stream were formerly discovered in preparing the foundations of the Paris Opera House. It flows into the Seine after traversing the Champs Elysées.

The railway company "de l'Ouest" have prepared the plans of a line between Dieppe and pottery, of a red terra-cotta, has been discovered in a field situated at the mouth of the Touch and the Garonne, in the outskirts of Toulouse. Some pearls and amber have also been found, and a search for further remains is being continued.

The statue by M. Barrias, "La Nature Mystérieuse et Voltaire se disputant devant la Science," which was a conspicuous work at the Salon of this year, has just been erected on the façade of the building of the Faculté de Médecine à Bordeaux. The sea-painters, M. Dumoulin and M. Paul Jobert, have been commissioned by the Government to proceed to Toulon to make studies for the picture intended to recall the meeting of the Russian and French fleets in the Mediterranean.

At Etiole (Drôme) last Sunday was inaugurated a monument commemorating the Provincial Federation in 1789. The monument consists of a pedestal supporting a column with an Ionic capital, surmounted by a star. The sudden death of an architect, announced, of a designer who had acquired a certain reputation in the illustrative Parisian journals under the name of "Dick & Lonlay." His real name was Georges Haridon.

M. Michel Hardengue, landscape painter, has died at Bourbourg at the age of forty-two. He was a pupil of M. Bonnat, and his works have figured, since 1875, in the Champs Elysées Salon. Among them may be named "Le Pain Beni" (1884), and in the last salon, "Le Soleil Couchant au Tréport."

BAVARIA.—A gathering of the members of the various societies whose object it is to develop what is termed in Germany a "rational" art feeling, has been held at Munich, and a special exhibition of the "rational" painters' materials was opened in connexion with it. A number of papers have been read by eminent artists as well as chemists, and it has apparently been decided to promote some measures for the restriction of the sale of adulterated paints. The painter Herr von Lenbach presided at the meeting. The first congress of authorities on the history of Art was held at Nuremberg last week. Papers were read by Professor Dietrichson (Christianism), on "Norse Architecture," and by Professor Neuirth (Prague), on "Cracow." An institution is to be founded specially for the encouragement of research in the history of art.

BELGIUM.—A set of fifty bells are to be hung in the clock-tower of the Maison du Roi on the Brussels market-place. The bells will cost the town 14,000 fr., and are to be in working order by next October. They will be used by special order of the Municipality on ringing chimers on certain fête days. According to our contemporary, *L'Electricien*, Brussels will apparently soon have its electric railway. Two underground lines are to be constructed, one connecting the lower town with the Quartier Leopold, the other to follow the course of the boulevards. The total cost of the proposed lines is to be about 17,800,000 fr., and the annual working expenses are estimated at about 750,000 fr. The necessary buildings for the Antwerp Exhibition are being erected under the superintendence of M. Haas, whose domestic architecture is well known in Belgium. The "Old Flemish Town," which is being put up on the exhibition grounds, is in the hands of the Flemish artist, M. Van Cuyck. At Ostend, the Eden Variety Theatre has been destroyed by fire. At Bruges, the workmen employed on the new sewer works came across some early-preserved tombs showing excellent polychrome decoration, and supposed to be of the fourteenth century.

BERLIN.—The title of a "Geheimer Baurath" has been given to Professor Orth by order of the Emperor. He is the only architect practising privately in Germany who has received the distinction which has, so far, been essentially reserved for architects in Government employ. The title was given on the occasion of the consecration of a new church lately completed by Herr Orth. The actual alteration of the interior arrangements of the Rhine's Royal Playhouse is at last complete. The stage and auditorium have now been made as safe as the original plan of the building allowed. A very well arranged exhibition of gas apparatus has been opened at Charlottenburg in connexion with a gathering of gas and water engineers which took place at Berlin. The show was considered a very successful one, nearly every kind of burner, gas stove, &c., being on view, and many inventions shown. The amalgamated societies of water engineers had invited essays describing the practical invention for the abatement of the smoke nuisance in large cities and had offered a premium of 3000 l. for the best contribution. The committee of assessors received six essays, but were satisfied with none of the proposals. The competition is to be repeated.

SAXE-COBURG-GOTHA.—Gotha is to have some central law-courts and a new prison at a cost of 22,000 l. A competition for a design has been opened and some valuable premiums (2500 l., 1500 l., &c.) will be given by a jury of seven expert assessors (including Professor Ende, of Berlin, and Herr Hugo Roth, of Leipzig).

MISCELLANEOUS

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.—The Sixteenth Voluntary Pass examination of candidates for the offices of Municipal Engineer and Local Board Surveyor, tried out by this Association, was held at the St. George's Hall, Liverpool, on Friday and Saturday, October 6 and 7. Seventeen candidates were entered for the examination. The examiners were: Municipal Engineering, T. De Courcy Meade, Inst. C.E.; Building Construction, H. P. Boulnois, Inst. C.E.; Sanitary Science, A. M. Fowler, Inst. C.E.; Public Health Law, J. Lobley, Inst. C.E. Mr. Lobley acted as superintending examiner. The next examination will be held in London in April, 1894.

EAST RIDING ANTIQUARIAN SOCIETY.—A respondent writes:—"Your account of the meeting of the East Riding Antiquarian Society and the recent excavations is otherwise so correct that you are not likely to have two slight errors pointed out. The 258, col. 3, line 5: The stone cloister was on the north side of the church, not the south. The one used at Watton is from the lower calcareous of which the nearest outcrop is at Birdsall, near

Malton, where the priory owned land. The Rev. E. M. Cole, who has written on Yorkshire geology, tells me that several churches on the Wolds are built of Birdsall stone. At Watton, the local chalk occurs occasionally in interior walling (facing) along with the grit."

INDUSTRIAL EXHIBITION AT HALIFAX.—A trades and industrial exhibition was opened on Monday in the Drill Hall, Halifax, under the auspices of the Provincial Trades Exhibition Company, Birmingham, and with Mr. Edward Cox, of Edgbaston, as manager. The object is to promote the commercial interests of the locality and to instruct and interest the people. There are close upon 150 exhibits, a large number of them illustrating the trades of Halifax and district, and filling the hall and the adjacent gymnasium. The ante-rooms are used for entertainments. The exhibition is lighted at night by electricity. The exhibition is to be continued till November 4.

THE STONEWORK OF THE CAMBERWELL VESTRY HALL.—We are informed that the stonework of the Camberwell Vestry Hall has just been cleaned and restored, the stonework being made to look fresh and clean, while the natural differences of grain and tint are not concealed. We understand that this has been done by treating the work with Searle's Stone Liquid after well washing it with soap and water. The liquid is said to waterproof the masonry and preserve it from decay.

THE PLOTTING PARLOUR, HULL.—Ye Old White Hart, a famous hostelry in Hull that dates from the middle of the sixteenth century, has been sold to Mr. Rodnell, of Lincoln, for 5,000 l. It was in a room in this house, now known as the "Plotting Parlour," that the authorities, during the Civil War, resolved to refuse King Charles admittance to the town.

NEW OVERMANTLE FOR THE LIVERPOOL TOWN HALL.—Considerable interest was manifested recently by the exhibition in the Council-chamber of Mr. Alderman Rathbone's gift of a carved overmantel for the vestibule of the Liverpool Town Hall. The work has come from Sharrott's, Chester, and is a wood-carving in the Jacobean style, the jambs of the gate being supported by large-sized figures. Round the peristyle runs a poetical legend.

PUBLIC WORKS IN ROME.—The British Consul at Rome, in a recent report upon the trade and finances of that city, observes:—"The Act embodying the measures adopted by Government in aid of the municipal finances, and for the completion of certain works which had been commenced, did not provide in a definite manner the ways and means for executing the works which the Government had taken upon itself to carry out. Consequently, it was found necessary to submit to Parliament a fresh Bill respecting this work in the capital. According to the Act, which has been adopted and promulgated, the State has undertaken to complete the Polytechnic Hospital by the year 1898, assigning for that purpose the annual sum of 60,000 l., and to lay out 1,380,000 l. upon an additional bridge across the Tiber, completion of Via Cavour and Piazza Venezia, Courts of Justice, &c. The installations in the principal streets for the illumination of the city by electricity, produced at Tivoli in the works of the Anglo-Roman Gas Company, have been successfully carried out, but the system of branching off the wires from the receiving station has been modified. Instead of using overhead wires, which would have given rise to a great many inconveniences and complaints from the owners of houses, the underground system was adopted, both in the distribution of electricity in private houses and for public illumination with street lamps. The two circuits are kept separate and the current is conveyed by independent cables. The streets lighted by electricity are Via Nazionale, new Corso Vittorio Emanuele, Via del Corso, streets leading from the railway station by Piazza Barberini to Piazza Colonna, including the square of that name. The tramway service has reached its complete development in respect to the present requirements of the city, new lines having been laid down, thus completing the net which had been fixed by the communal administration. The lines are all worked by horses, but it is proposed to use electricity on some of them. The works connected with the new quay at Civita Vecchia proceeded uninterruptedly during 1892, and it is expected that by the end of this year the whole of the quay will be above water. The whole work, as far as it is foreseen, will be completed in about two years from the present time."

LEGAL.

BIRMINGHAM CITY POLICE COURTS.

Court No. 2, before Messrs. Fisher and Warden. Edwin Airey, of Star-villa, Gillott-road, was summoned at the instance of Mr. W. S. Tili, City Surveyor, for contravention of the City by-laws in five different cases, in respect to a house that has been erected in Gillott-road; first, for covering up the drain to fresh-air inlet without notice, having been forwarded to the City Surveyor's office for its inspection; second, that he did erect an inefficient

ventilating shaft in zinc in lieu of iron, as marked on approved drawing; third, that he did extend the building, and construct an internal water-closet without having first deposited and obtained the approval of plans; fourth, for having the drain to water-closet to run underneath a building, where it was practicable to bring separate drains outside; and fifth, for allowing the house to be occupied prior to sending in completion notice.

The defendant was represented by Mr. Mallard, solicitor, and the prosecution was conducted by Mr. Bell, of the Town Clerk's office. The evidence in each of the separate cases was as follows:—

Case No. 1.—Mr. Turner, Drainage Inspector, gave evidence that the drain to fresh air inlet had been covered up, and had not been inspected, and that on being uncovered found that the pipes were not jointed in any way, but that all the joints were left open.

Case No. 2.—Mr. Lloyd, Building Surveyor, stated that the joints of the ventilating pipes were badly made, and would admit foul air into the bedroom window, which was within 6 in. of the same, and that a proper joint could not be made between zinc and iron.

This evidence was corroborated by Mr. Turner and Mr. Osborne, plumber, of Latimer-street South, who stated that he was a man of thirty years' practical experience.

Case No. 3.—Mr. F. W. Lloyd gave evidence that the defendant had extended the building and constructed an internal water-closet, and had departed from the original drawing, and without depositing and having obtained the approval of new plans, this evidence was supported by Mr. Turner, who stated that the work was carried out in an inefficient manner.

Case No. 4.—Mr. Lloyd gave evidence that it was practicable to construct separate drains, and not to run two water-closets into one drain; this was supported by the Drainage Inspector. A plumber, Mr. Marlow, was called by the defendant's solicitor; when asked what he was by the bench he said he was a plumber; asked how long, he replied he was born a plumber. He gave his evidence in such a loose manner that he was ordered to leave the witness-box by the bench.

Case No. 5.—The Building Surveyor stated that he had received a letter from the defendant which said that he had had an application from a person who wished to become a tenant, and he (the defendant) wanted the house occupied at once. Upon visiting the house on June 9 the Building Surveyor found the house had been occupied for some considerable time. Mr. Turner supported the Building Surveyor's evidence, and that he (Mr. Turner) had visited the house on June 3, and found it occupied then. The Building Surveyor then said that having found the house was a series of contraventions of the by-laws, served notices on the defendant to make the various alterations required, but none of these notices had the defendant acknowledged or complied with in any shape or form, consequently proceedings were taken some six weeks ago, and adjourned for the convenience of the defendant, who then gave an undertaking, through his counsel, that the whole of the works required should be done at once, and to the satisfaction of the surveyor. The work not being done, the case was brought up again.

Mr. Fisher, the Chairman, addressing the defendant, commented very strongly upon his conduct, and stated that the by-laws of the City were made in an intelligent manner for the guidance of architects and builders in general, and that defendant being a medical man should be conversant with their requirements. He stated that disease and illness which was prevalent was largely due to the conduct of such men as the defendant, and he also stated that the officials of the City were endeavouring, and rightly so, to carry these by-laws into effect, and they must be upheld. Continuing, he stated that they had given the case serious consideration, and arrived at the conclusion that the defendant, as a warning to himself and to others, must be made an example of, and in Case No. 1 they should fine him 5 l. and costs, or one month, and in each of the other cases 2 l. and costs, or fourteen days, the sentences to run consecutively.

CAPITAL AND LABOUR.

THE LOCK-OUT IN THE BLACKBURN BUILDING TRADES.—After the lapse of fourteen weeks the difficulty in the building trades in Blackburn appears to be no nearer settlement than at the beginning. It will be remembered that the plasterers, who gave notice in March last for an advance, refused to continue at work at the end of the three months unless their demand was conceded. Upon this the masters locked out the carpenters, bricklayers, plasterers, and all the rest engaged in building operations, with the result that 1,400 men have been out of employment all this time. The trades union men say that the whole country has been scourged for "blacklegs," but that, notwithstanding all the allurements offered by the masters, only about fifty men of that class have been induced to come to the town. All building operations are at a standstill.

COMPETITION, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITION.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*Drainage Scheme	Staines Local Board ..	.....	Nov. 10

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Sewerage Works	Hendon Local Board ..	S. S. Grinley ..	Oct. 16
Residence, Britton, Yorks ..	.....	.....	Oct. 17
Shop Premises, Albion Court, Bradford ..	.....	.....	.....
Additions, &c. Close Hill, Huddersfield ..	Close Hill Coop. Soc. ..	J. Berry ..	do.
Sewerage Works, &c. Detschshire Park ..	Bucknall Corp.	G. Brown ..	Oct. 18
End of Market Hall	Burley Corporation ..	P. S. Hutton ..	do.
Village, St. Stephen's-by-Lanercost ..	Sheff. Hl. Corporation ..	Ringo & Ogden ..	do.
Brick Culvert	Leeds Lads. Coop. Soc. Ltd.	C. F. Wiles ..	do.
Store Premises, Idle Green .....	.....	.....	do.
Making-up Glasshouse-road, &c.	Kingston U.R.S.A. ..	Official ..	do.
Public Offices, Stables, &c. & Main-road ..	Bowdell and Fenham Local Board ..	.....	do.
Coal Stage, Part of &c. Red rd ..	M. H. Co.	do.	Oct. 19
Water Supply Works, Pontypridd ..	Pontypridd R.R.A. ..	O. S. Morgan ..	do.
Laying Pipes	Post Office (N. B.) Rileys Co. ....	.....	do.
School, Gymnasium, &c. Hopwoodlane ..	H. R. S. Jones ..	Udley & Gray ..	Oct. 20
Street Improvements	Ilkley Local Board ..	M. Hainsworth ..	do.
Enlarging Post Office, Bolton ..	Com. of H. M. Works ..	Mant & Mant ..	Oct. 21
Building House, &c. Sturton, Sussex ..	Redbourne Chantry Sch. Bd.	W. Drew ..	do.
Board School	B. B. in Stortford L. Board ..	Official ..	do.
Granite Road Metal (700 tons)	Parkstone Rural Bd. ..	do.	do.
Wrest in Ungha-bale Building ..	Went. & nat. White School Board ..	do.	Oct. 23
Tron Building (on hire)	South Metro. School Board ..	do.	do.
Disinfecting Station	Blackney Bd. of Wks. ..	do.	do.
Valve shaft & Reservoir, Clough Bottom ..	Bury Corporation ..	J. Cartwright ..	do.
Police Station, Hemel Hempstead ..	Herts County Council ..	U. A. Smith ..	do.

CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Plating Coverings, Footbridge, &c.	G. W. R. Co.	Official ..	Oct. 24
Boiler End	Sheffield Union ..	W. H. Ward ..	do.
Additions to Schools, Fir Vale .....	.....	do.	do.
Iron Escape Stairs, Worchouse, Fir Vale ..	.....	do.	do.
Pipe Sewer, &c. Mosley Common, Lancs.	Tyldesley with Shakerley Local Board ..	T. W. Travers ..	Oct. 25
*Filling Works, King's road ..	Pulham Vestry ..	W. Sykes ..	do.
Sewerage Works, With	Rush (F.R.S.A.) ..	Official ..	do.
School Buildings, Walsall street ..	Wolverhampton S.B. ..	T. H. Fleming ..	Oct. 27
*Public Works	Walthamstow Loc. Bd. ..	G. W. Holmes ..	Oct. 30
*Public Works, Hydraulic Machinery, &c.	Barry Railway Co.	J. W. Barry ..	do.
*Opening Bridge, Hydraulic Machinery ..	.....	do.	do.
*Geological Conduits	Com. of Sewers ..	Official ..	Oct. 31
*Sewerage Works &c.	Lewisham Bd. of Wks. ..	J. Waldman & Son ..	do.
*Water Supply Works	St. Columba R.S.A. ..	H. Masterion ..	Nov. 1
*Laudry, Western Hospital ..	St. Mary's Hospital ..	A. S. C. Harton ..	Nov. 2
School Buildings, Cross Hands ..	Lauderh. U.R.S.A. ..	.....	do.
*Extension of Married Couple's Quarters ..	Admiralty ..	David Jenkins ..	do.
*New Coast Guard Station, Cornwall ..	Com. of the West-Insular and Naval Institution ..	.....	Nov. 7
Extension of Institution, Siltth ..	.....	.....	do.
Baking Shift, Featherstone, Yorks ..	Arcton Colliery ..	J. Graham ..	No date.
Chapel and Schools, Summerbridge, Brad. ....	.....	W. J. Morley ..	do.
*Erection of Buildings	Ordinance and Authorities ..	Official ..	do.
.....	Synodicate ..	E. N. Cubitt ..	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be made by.
*Assistant Surveyor ..	Civil Service Com. ....	.....	Oct. 14
*Road Foreman ..	City of Birmingham ..	2 ..	Oct. 20
*Surveyor ..	Fourth Local Board ..	200 ..	Nov. 8
*District Surveyor (East Newington, &c.) ..	London County Council ..	.....	Nov. 11
*Architectural Draughtsman ..	Walsley County Council ..	180 ..	No date.

Those marked with an Asterisk (*) are advertised in this number. Competitions, p. iv. Contracts, pp. iv, vi, and vii. Public Appointments, pp. xx, xxi, and xxiii.

MEETINGS.

FRIDAY, OCTOBER 15.

Architectural Association—Annual General Meeting: Address by the President, Mr. E. W. Mountford. 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers)—Mr. Keith D. Young on "Sanitary Building Construction." 8 p.m.

SATURDAY, OCTOBER 14.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers)—Visit to the L. & N. E. Railway Company's Farm, College Farm, Finchley. 3 p.m.

MONDAY, OCTOBER 16.

Liverpool Architectural Society—Opening Address by the President, Mr. H. Hartley. 6.30 p.m.

TUESDAY, OCTOBER 17.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers)—Visit to the East London Soap Works, Bow.

Glasgow Architectural Association—Mr. Gilbert Thomson, M.A., on "Modern Drainage Arrangements." 8 p.m.

WEDNESDAY, OCTOBER 18.

Builders' Foremen and Clerks of Works' Institution—Quarterly Meeting of the Members. 8.30 p.m.

FRIDAY, OCTOBER 20.

Sanitary Institute (Lectures for Sanitary Officers)—Mr. J. Wright Clarke on "Details of Plumbers' Work." 8 p.m.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

20,181.—DRY CLOSETS: *L. Harris and another*.—According to this invention the floor of the closet is sufficiently raised to form a cavity or chamber underneath for receiving the ashes from riddling clanks. These ashes are fed into a receptacle and delivered through a riddle or sieve into the pan. Provision is also made for removal.

21,064.—FLOORING COMPOSITION: *H. Lockwood*.—Burnt oxide of iron obtained in the manufacture of sulphuric acid resulting from purification of coal-gas is employed; it is mixed preferably with anthracene pitch, three of softened pitch and two of the burnt oxide being the best proportions.

21,110.—GROVES: *H. A. Daxel (Paris)*.—For heating and cooking, an oil-stove is provided with interchangeable tops. A casing is provided to receive and retain a grid for cooking, and a radiator is fixed when the stove is used for heating only.

20,669.—VENTILATING DRAIN COVERS: *W. H. Morgan*.—By means of this invention, a cover is employed capable of being used either as a ventilator or non-ventilator easily adjusted in both ways. This is effected by the use of an iron-plate and a rod on which the dirt-box hangs. When it is desired to close the aperture

the rod is brought up and the dirt-box hermetically seals the drain.

15,577.—FRAMING OR STRENGTHENERS FOR CORRUGATED IRON OR STEEL SHEETING AND ROOFING: *W. Thompson*.—The invention consists in making the stretchers or framing to which corrugated sheeting or roofing is to be affixed of coupled bars of L or T section steel or iron (placed in pairs and parallel) having an open space between their edges to allow bolts or rivets to pass between.

15,721.—HEATERS FOR FIRE-PLACES: *A. J. Boul* (a communication from abroad).—This invention relates to certain improvements in fire-places and stoves in order to secure greater heating power. A hot-air place is constructed between the outer and inner walls of the house, its lower end resting on the top of a stove of novel and peculiar form, and its upper extremity opening into the room, or rooms, between the mantelpiece and the ceiling.

10,761.—SELF-EXTENDING SCARFLOCKS: *P. P. Mazzoni*.—Four square upright timbers, perforated with holes at intervals, and two of them provided at their feet with roller wheels, are so secured together by a cord to support a platform at any height for interior painting, &c. The arrangement is capable of convenient and quick alteration, or change of size and height.

10,829.—FIXING FOR SASH-CORDS: *A. E. Williams*.—This invention relates to a means of fixing the sash-cord to the sash in such a way that a broken cord can be removed and a fresh cord substituted without having to take the sash out of the frame. This is effected by providing a small clamp embracing the cord. Should the latter break, this clamp grasps it in such a way that it can be drawn up and a new sash-line substituted for the broken one.

NEW APPLICATIONS FOR LETTERS PATENT.

SEPTEMBER 25.—17,952, W. Harris, Sewer Ventilators. —17,953, J. Blennerhasset, Champer, Edge Doves.

18,003, R. Bergfeld, Iron Stairs.—18,005, R. Bennett, Varnish.

SEPTEMBER 26.—18,026, J. Clayton, Window Frames and Sashes.—18,040, A. Ward, Ventilated Fireproof Floor.

18,075, D. Wilson, Pavements, Floors, Stair Treads, &c.—18,083, A. Johnson and K. Lingell, Window-fasteners.

SEPTEMBER 27.—18,127, T. Fawcett, Brick-making Machinery.—18,173, A. Beer, Stair Treads.

SEPTEMBER 28.—18,185, H. Powell, Machine for the Spiral Turning of Wood.—18,204, P. Glen, Windows.—18,217, J. Churchill, Water-wash Preventers, &c., for Flushing Purposes.

SEPTEMBER 29.—18,265, S. Reeves, Nails, Screws, and Hooks.—18,318, H. Graft and F. Clary, Plumb Indicator.

SEPTEMBER 30.—18,325, J. Harvey, Clamp.—18,379, W. Marshall, Collapsible Frames for Gates, Shutters, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

14,550, J. Murphy, Head Lights.—15,465, The Adamant Company, Limited, and J. Wilkinson, Fireproof Flooring.—15,881, E. Joseph de la Rooye, Varnish for Woodwork.—15,919, W. Hooker and C. Fitch, Hanging Sliding Windows.—20,260, to be opened from the inside for cleaning and other purposes.—15,993, W. Johnson, Machines for Pressing Bricks.—16,087, W. Beattie, Pipe Joints.—16,323,

W. Dransfield, Water and Gas-pipe Hooks.—16,371, E. Dredge, Automatic Door-top.—16,388, R. Young, Window Fasteners.—16,467, G. Vaughan, Attaching Door Knobs to their Spindles.—16,518, M. McHaffie, Makin Building Blocks.—16,612, H. Libbey, Combined Spring Hinge and Door Check.—16,697, W. Hickson, Decorative of Interiors.—16,809, J. Martin, Tiles and the method of Tiling Roofs, Walls, &c.—16,948, J. Bannehr and W. Chattaway, Ventilation of Sewers.—17,023, T. Barker, Water waste Preventer for Closet Cisterns.—17,064, H. Snell, Drain Pipes or Sanitary Tubes.—17,159, V. Wilson and W. Priest, Paints.—17,162, E. Jeffcoat as J. Bates, Manufacturing Gutters, Traps, Siphon and other Sanitary Work.—17,257, L. Crosthwaite, Plaster, Plaster, Mather, and Traps.—17,347, E. Hughes, Ventilating Apparatus.—17,411, J. Morton, Ornamental Materials for Decoration Walls, Ceilings, Floors, &c.—17,529, J. Crosthwaite, Grates or Stoves.—17,591, C. Kinnell, Actuating Valves.—17,629, J. Houghton, Window.—17,679, H. Tuki Machinery for Making or Cutting Bricks, &c., from Plastic Clay or other material.

COMPLETE SPECIFICATIONS ACCEPTED.

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18,255, W. Crow and S. Lehmon, Gutters and Drainage.—20,763, T. Payne, Fire Grates, Stove Ranges, and Stove Combustion in Stoves.—21,236, R. Williamson and Dyson, Archimedean Screws.—21,417, W. Bradford, D. Infection Apparatus.—21,911, E. Ward, Syphonic Pipe Cisterns.—6,544, L. Havaux, Apparatus for Cutting Glass.—14,994, J. Mathison, Door Locks and Latches.—16,021, A. Burton, Window-fasteners.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

OCTOBER 2.—By *Sinclair & Son*: 4, Clephane-Canonbury, ut. 53 yrs., g.r. 6l. 15s., R. 45l., 390l. 1/2. St. Paul's-rd., ut. 53 yrs., g.r. 74s. 45l., 415l.

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OCTOBER 4.—By *Sinclair & Son*: 1, The Enfield, Enfield, ut. 31 yrs., g.r. 13s., R. 10l., 100l.; 13, Stanford-rd., Kensington, ut. 39 yrs., g.r. R. 55l., 430l.; By *Holcombe & Betts*: 20 to 23, Lill Carlisle-st., Lissong Grove, ut. 29 yrs., g.r. 42l., 225l. 1/2.

OCTOBER 5.—By *Sinclair & Son*: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

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SUNDERLAND—For the erection of school buildings, Chester-road, Balaug-cum-cum, for the School Board. Messrs Oliver & Leeson, architects, Newcastle-on-Tyne. Quantities by Messrs. Roseham & Norton, Sunderland—
 Thomas Lumsden..... £14,850 0
 John W. White..... 14,274 0
 Walter Scott..... 13,492 0
 John Elrick..... 13,354 0
 Joseph Elliott..... 12,390 0
 Robert Allison..... 12,785 0

Thomas P. Shafton..... £12,680 0
 W. R. Cooper..... 12,099 0
 D. & J. Ranken..... 11,975 0
 Geo. H. Hodgson..... 11,888 0
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The Builder.

VOL. LXV. No. 2646.

OCTOBER 27, 1893.

ILLUSTRATIONS.

Glasgow Athenæum: Front to Buchanan-street.—Messrs. J. Burnet, Son, & Campbell, Architects	Double-Page Photo-Litho.
End of Bath Room, in Tiles, Mosaic, and Faience.—Designed by Mr. Charles Temple	Double-Page Ink-Photo.
Competition Design for the Church of St. Peter, Abbeydale, Sheffield (Interior).—Mr. Sydney Vacher, A.R.I.B.A., Architect	Single-Page Ink-Photo.
Portion of Lower Canopy, Bishop's Throne, Exeter Cathedral.—Drawn by Mr. S. K. Greenslade	Single-Page Ink-Photo.
Competition Design for the Church of St. Peter, Abbeydale, Sheffield (Exterior).—Mr. Sydney Vacher, Architect	Single-Page Photo-Litho.
Gamekeeper's Lodge in the Ardennes.—Messrs. Kidner & Berry, Architects	Single-Page Photo-Litho.

Blocks in Text.

A Sketch in Norwich showing Tower of St. Peter's, Hungate (now destroyed) p. 298	Plans, New Wing, Glasgow Athenæum p. 308
Diagrams illustrating article on Geology (Student's Column).....	Pp. 325-6

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The Elasticity of Materials.



THE late Dr. Todhunter, the eminent mathematician of Cambridge, commenced an analysis of various valuable memoirs of experimental data, dealing with the develop-

ment of the theory of elasticity from Galilei to the present time, but omitted all memoirs dealing with the physical or technical branches of the subject. This excellent idea of possessing a short abstract or *précis* of individual memoirs was continued by Professor Pearson, and in order to render the publication more complete, the printed volumes edited by him* are found to contain the addition of physical and technical problems. Each article is numbered for reference and systematically indexed. Furthermore the reader is assisted by reference to the other articles throughout the work which deal with any special subject. Seven years have elapsed since the first volume was published, and the present volume, forming Part I. and Part II. under separate covers, contains 1,818 articles dealing principally with the decade of the years 1850 to 1860.

Modern elastical research is based upon the investigations of the following authorities, no longer alive, Saint Venant, Rankine, E. Phillips, Bresse, Clapeyron, E. Winkler, Angstrom, Joule, Matteucci, Kupffer, Wertheim, Morin, Fairbairn, Hodgkinson, Wade, Mallet, Cavalli, Tresca, Kirchhoff, and Clebsch, as well as upon the experience of the following living scientists: H. Resal, C. Neumann, F. Neumann, Boussinesq, G. Wiedemann, G. H. Love, A. Wöhler, Grashof, Kirkaldy, and Thomson, the latter now known as Lord Kelvin; and to him the publication is dedicated. Much that is of value to both the physicist and technologist is contained in these notes, which Professor Pearson has ably edited and completed

for the syndics of the University Press, but a good knowledge of French and German is necessary to profit by a perusal of these volumes, as the extracts from foreign authorities are not translated. The first authority to whom allusion is made in Vol. II. is St. Venant, who was born in the year 1797, and died in the year 1886. The author, in estimating the value of St. Venant's contributions, states that "we have first of all to note that he was essentially the originator on the theoretical side of modern technical elasticity. In his whole treatment of the flexure, torsion and impact of beams, he kept steadily in view the needs of practical engineers, and, by means of numerical calculations and graphical representations, he presented his results in a form wherein they could be grasped by minds less accustomed than his own to mathematical analysis." At the same time he was no mean master of analytical methods, which accounts for his also undertaking purely numerical calculations, before which the majority would stand agast. In another part of the volumes before us, the practical important numerical calculation of results is mentioned as the peculiar characteristic of St. Venant. In his translation of Clebsch's work, he corrected innumerable errata; so much so, that the author of the present important historical work considers it safe to predict that for the future, Clebsch will be chiefly read in the French edition, and not in the German original. Commenting upon Clebsch's treatise, the author remarks, "we have here a good example of how the love of original investigation may render it impossible even for a mathematician of genius to write a text-book especially suitable for a particular class of students," but elsewhere adds that "while there are many phenomena of great practical importance which cannot be explained by existing mathematical theories, yet those theories used with proper limitations are capable of being made of great service in directions not hitherto considered." At the same time it must be remembered that we cannot always apply in practice any distribution of force in exactly the same way as represented by theory. "The fact is," as stated by the author, "that to grasp thoroughly the bearing

and mutual relations of the secondary elastic properties we must know what is the real kinship between the various branches of physics, when viewed from the standpoint of the molecule; and this is very far from being understood even forty years after Kupffer" recorded his investigations. "The lesson to be learnt from the controversy" between the records of theory and experimental research is the ever-recurring one, namely, "the need that physicists should have a sound mathematical training or failing this, leave the theoretical interpretation of their results to the mathematician."

The author, while acknowledging that it is beyond his province to enter into a discussion of the metaphysical arguments propounded in other memoirs or the very wide range of philosophical reading evidenced by other records which have proved epoch-making in the science of elasticity, yet renders the bulk of his abstracts so full of mathematics, that so far as methods are concerned, these elaborate but historically important volumes are more likely to be intelligible to the mathematician than to the ordinary designer in construction.

The first text-book which brought the theory of elasticity in a scientific form before engineering students was Rankine's "Applied Mechanics," a book which was a very distinct advance upon any work previously published, and one, like others of Rankine's writing, characterised by a mania for nomenclature, yet, notwithstanding its richness in terminology, extremely suggestive. To Rankine the author attributes the scientific appropriation of the word "strain." In one of Rankine's memoirs, the late Professor writes, "It is desirable that some single word should be assigned to denote the state of the particles of a body when displaced from their natural relative positions. Although the word 'strain' is used in ordinary language, indiscriminately to denote relative molecular displacement, and the force by which it is produced; yet it appears to me that it is well calculated to supply this want. I shall, therefore, use it, throughout this paper, in the restricted sense of relative displacement of particles, whether consisting in dilatation, condensation, or

* A History of the Theory of Elasticity and of the Strength of Materials. By Dr. Isaac Todhunter, F.R.S.; and Professor Karl Pearson, M.A. Cambridge University Press. Volume II., 1893.

distortion." Rankine reserves the term "stress" for the dynamic aspect of elasticity, and "strain" for its geometrical aspect. Such works as those of Rankine and Weisbach, the author considers, separate very distinctly the first decade of our half century from the previous thirty years. The step to them from books of the type of Tredgold's is very great, and marks the beginning of the era of "technical education."

The discovery that the cross sections of a beam under flexure do not remain plane, even within the limit of elasticity, is attributed to St. Venant. Both C. L. Moll and F. Reuleaux emphasise the important principle that "the rupture strength of a material is not a true guide to its use in construction"; and Morin asserts that "the limit of safe stress for practical purposes is the elastic limit." Referring to welding anchor rings and others of circular form, Winkler showed that "the weld should be subjected to the least positive traction; hence the proper place to weld them does not seem to be at the section to which a load is applied, but in the case of a ring without a stud, about 40 deg. from this section, and in the case of a ring with a stud, about 30 deg. from the same section. As in the former case the ring can generally slip round so that the load may be applied at every section, we ought to provide for the welded section being able to sustain easily a traction equal to the greatest traction, which occurs in this case when the welded joint is the loaded section." And in another paragraph he states that "before rupture is reached, set has changed the shape of the link, and the links press upon and hold each other, till in some cases the absolute strength of a chain appears to be close upon the absolute shearing or even tensile strength of the material."

Referring to built-up struts, Scheffler points out "that for bracing bars it is usual to take the length not more than twenty-four times the least diameter of the cross section, but that for this ratio the buckling strength of wrought-iron struts is two-thirds the compressive strength, and therefore very nearly equal to the tensile strength. Hence, for practical purposes, the tensile strength can always be taken to determine the dimensions of a bar. As in most practical cases, bracing bars are subject to alternate stress, this, if correct, would give the convenient rule that the dimensions are to be determined from the maximum load, without regard to the sign for tension or compression."

Wiedemann finds a comparison between the properties of magnetism and of torsion which the author fairly considers are pressed rather too much in his Memoirs.

The strength and other properties of cast-iron are commented upon in the article upon minor technical text-books, those by Scofield, Fairbairn, Truran, and others, showing that the tenacities of cast-iron prepared with cold and hot blast respectively are nearly as 1 to 8; remeltings increasing the density will increase the tensile strength two to three times; maintaining the iron in fusion, which has much the same influence, will also nearly double the tensile strength; while casting under a head, rapidity of cooling, &c., which processes increase the density, also produce increase of strength.

Thus it will be seen that the scope of the volumes before us, consisting altogether of 1,320 pages, extends beyond the topics of history. Lord Kelvin's investigations upon the Molecular Constitution of Matter, and his papers upon the Mathematical Theory of Elasticity, furnish great advances in the subject. To him is justly attributed the accurate foundation of the science of thermo-elasticity, the suggestion that the principles of elasticity ought to be applied to the earth itself, and the first consideration following thereon, suggestion of tides in the solid earth. In conjunction with P. G. Tait, his geometry of strain and his treatment of rods and plates have largely contributed to our appreciation of pure elastic problems, and have greatly assisted in rendering the dis-

cussion of them accessible to British students. When we consider the very large number of memoirs written by eminent men, "the proportion," as stated by Professor Pearson, "which may be classified as absolutely worthless is extremely small." We must therefore thank him for the compilation of an easily-accessible record of some of the most important documents connected with the technical researches of the past, a work of a comprehensive and laborious character, forming a repository of facts in regard to elasticity rather than a historic *résumé* of its purely mathematical side.

ARCHÆOLOGICAL WORK IN EGYPT.

THE Egyptian Exploration Fund has published its report* for the year 1892-93. It is a record of a year's hard work by several willing workers, and it will be read with interest by every one interested in Egyptian discovery into whose hands it may fall. The place of honour is given to Professor Naville's notice of the excavations carried out by him in the winter of 1892. The explorations were begun on the site of the City of Mendes, about forty miles west of the Suez Canal, where there are two large mounds or Tells, one being covered with Roman ruins, the other with those of buildings of early date. Here M. Naville discovered an Egyptian statue of large size, of a king, which appears never to have been completed. It belongs to the Saitic period, but it is remarkable from the fact that in Roman times the face was reworked to a likeness of Caracalla. It has been removed to the Ghizeh Museum, which is a fortunate circumstance, unsatisfactory as it is to remove an ancient monument from its original position. But the villagers have made a quarry of the site, and the statue would most probably soon have been destroyed. The results of the excavations in other ways were not satisfactory to the explorers, although on another part of the site, a fine Hathor-headed capital of a column was found. Other excavations were made at Tell Mokdam, where the site of a temple is still visible, although all the stones have been carried away.

In the north-west corner of the mound the base of a statue of the twelfth dynasty had previously been found by the fellaheen, but M. Naville discovered another. Here cartouches of Usertesen III. were found on bases which had been usurped by Osorkon II. who had cut his cartouche right across those of the earlier king without erasing them. M. Naville proposed another reading for a previously-observed name on the base of a statue, "Nehasi, the negro," and conjectures that during the little-known period which extends from the twelfth dynasty to the time of the Hyksos, one of the causes of anarchy may have been the invasion of Ethiopians and the setting up of a negro king. This may prove to be a new page of Egyptian history, but it must rest on more solid proof.

Mr. Newberry relates the progress made by the archaeological survey during the year. The tombs at Sheikh Saïd, on the east bank of the Nile, a few miles to the north of the now-celebrated site of Tell el Amarna, over eighty in number, have been explored, and the inscriptions and wall paintings copied. This is an important work, since they date from the early kingdom. Other tombs in the locality have also been surveyed, and, in addition, the tomb of King Khuenaten, the founder of Tell el Amarna, has been measured.

An interesting chapter of the report is devoted to the progress of Egyptology during the year, and many interesting discoveries are recorded. One of the most interesting of these is the finding of an approximate date

for the beginning of the XVIIIth dynasty. The ninth year of King Amenhotep I. is proved to be about the year 1550-1547 B.C. The discovery of a tablet at Lachish by the Palestine Exploration Fund, similar to one found at Tell el Amarna in Egypt, is "one of the most remarkable coincidences of discovery on record." Herr Brugsch-Bey, Curator of the Ghizeh Museum, contributes a note on the official excavations at Memphis and in Upper Egypt, and the works of several other explorers are referred to. But the literary discoveries of the year are perhaps of still greater importance than the monumental ones; and, apart from the meeting with the apocryphal gospel and Apocalypse of Peter, it has to be remembered that the past year has witnessed the recovery from the dry soil of Egypt of fragments of the oldest Greek MSS. at present known to exist. The year has been a remarkably prolific one with respect to the recovery of ancient manuscripts, and it augurs well for others in time to come of greater importance still.

The Society may be congratulated on the results of its year's work; and all intelligent explorers may learn from this report, even if no other evidence were at hand, of the rich and abundant results that appear to follow researches wherever made in the land of Egypt.

NOTES.

IT is an undeniable fact that the miners have decidedly the best, so far, of the dispute in the coal trade, although their victory is only partial, and is probably but temporary. At the same time, this is no proof that no reduction was called for when the notices were originally given. What the miners have gained has been largely at the expense of the public, and at a terrible cost to themselves. The partial resumption of work at the old rates was rendered possible by the phenomenal prices which were to be obtained for the coal raised; and, therefore, it cannot be said that in being re-opened at the old rates, the pits have been re-opened on the old conditions in other respects. In a great many instances these are considerably changed, but in spite of the numerous re-openings of this week and last, there are still a larger number of Federation men idle than there are at work. Many of the owners still adhere to their determination not to resume, even temporarily, at the old rates, believing that the necessity for a reduction is less imperative for the moment than it was when the lock-out commenced—has not disappeared. Indeed, at some of the Yorkshire pits, an intimation has been posted to the effect that unless their men agree to a reduction the pits will be closed for the remainder of the year. Alderman Gainsford, managing director of Yorkshire collieries, employing over a thousand men, declares some time since that the low rates paid in Durham and Northumberland were the real cause of the trouble in the other counties; and suggested that the men should accept a reasonable reduction for the present, and that any percentage of increase which the Durham men might gain should also be by arrangement given to the Midland Federation. This might have formed the basis of a settlement had the men shown any disposition to accept a compromise; nor would they have been at work long before obtaining an advance under this arrangement. But, so far, all suggestions of compromise have come from the other side, and from would-be mediators, and have been promptly rejected.

IT is much to be hoped that the Conference last week at Oxford on Secondary Education will bear some practical fruit. It is admitted by all competent judges that the subject demands instant attention from the Government. The consensus of opinion at the conference was in favour of the appointment of a Royal Commission to lay down the lines of some uniform system. It is clear

* Egypt. Exploration Fund: Archaeological Report 1892-3. Edited by F. L. Griffith, B.A., F.S.A. London: Kegan Paul, Trench & Co.; Bernard Quaritch; Asher & Co.; and Egypt Exploration Fund.

that a complete system of technical education cannot be obtained without an equally complete system of secondary education. Higher technical training must be a part of the secondary education of the country. Again, a large bulk of those who are employed in commercial business in the country depend on what is called the secondary education, and only by an efficient national system can this class be put on a level with foreign competitors. There are plenty of journals to take up the cause of agriculture, but it is pretty obvious that a complete system of secondary education in this country would raise the standard of knowledge among farmers, and so enable them to compete on fairer terms with their rivals. The fact is to some extent the same in regard to other trades. There are few means of complete education for those who fall between the public elementary schools and the higher public schools of the country, and there is little opportunity for the more promising of the scholars in elementary schools to pass into those of a higher grade.

MR. LEONARD COURTNEY in one of his addresses to his constituents last week, referred to the question in relation to the Employers' Liability Bill of permitting employers to contract themselves out of the Act by establishing an insurance fund, out of which workmen should be compensated in case of any accident whatever. By this scheme the necessity of a law-suit is avoided and compensation is completely provided. Mr. Courtney speaks with authority; he is a member of the Labour Commission, he has an eminently impartial mind and great knowledge of all questions of business and economics. He distinctly states it as his opinion that "a scheme of that kind deserves to be accepted as a substitute for the liability of the employer," and he also thought it should be made applicable to all companies, and that individual traders might by association form such an insurance fund. We are glad to see a man of Mr. Courtney's mark take this view. It is to the interest of the workman that such insurance funds should be formed. It relieves him from all uncertainty in case of accidents; it prevents him from being under the necessity of going to law should an employer refuse to pay compensation for an injury which he has received. It substitutes a common-sense and equitable arrangement for the comparatively barbarous method of obtaining compensation by process of law, and it tends to good feeling between employer and employed.

OUR Berlin contemporary, the *Centralblatt der Bauverwaltung*, recently devoted some space to a description of the new granite quarries on the Island of Bornholm, in the Baltic, the proposed development of which we referred to about two years back. These quarries, which are now being rapidly developed by some German capitalists, whose engineers already have sufficient work in hand, are expected soon to have a regular output of 100,000 tons of granite, 10,000 of which are to be worked to dimensions on the spot, the rest delivered as raw material. This granite could be easily brought into the English market through the North Sea-Baltic Canal, which is now nearly completed. The estate on which the quarries are situated is on the extreme north of the island, close to the historical ruins of the old Hammersholm. Besides the quarries proper, the estate has an extensive masons' yard and a newly-constructed harbour, with a perfect system of narrow-gauge railway and trolley inter-communication. Herr "Land Bauinspector" Marks, who has acted as Civil Engineer to the promoters of the enterprise, has seen that the most recent improvements were introduced throughout the estate, both in machinery and general facilities for the necessary manual labour; the adoption of

the simple expedient of gradients in the masons' yard has already proved to be of great service.

THE Transactions of the American Society of Civil Engineers, dated June of the present year, which volume we have just received, contain some useful notes upon the subject of "Erosion in River Banks," in which the author describes the term "erosion" as implying a steady wearing away, as distinct from a more rapid change in a line of bank. The character of vegetation, he considers, has little or nothing to do with the amount of erosion. In some cases the caving has been continuous, if not constant, and in some cases, as in the instance of the Mississippi and Missouri Rivers, the conditions have changed from erosion to accretion. No great amount of caving occurs at high water. The period of greatest activity is generally found to be during a falling stage from a little below the medium stage downwards. The banks of the river described by Mr. Ockerson in the paper alluded to being composed of sand and silt, with horizontal layers of clay at irregular intervals, become saturated for a considerable distance from the river during the high-water period, and, as the water in the river falls, it carries with it all that has penetrated the banks, and consequently the greater part of the sand which supports the layers of clay. This process is, of course, aided by the drainage from the overflowed lands and the impinging current in the bends. The result is that a large block of ground, sometimes 200 ft. or more in width, and perhaps one mile in length, settles down bodily several feet. The trees stand vertical for a long time, gradually settling deeper and deeper, as other layers wash out; and the block is finally broken up, disintegrated, and disappears. When a narrow neck of land separating the bend finally breaks through, the author applies the term "cut-off." Such a neck of land may be narrow for some distance around the bend, and consequently the slope across it becomes greater than the general slope of the stream. That the "cut-off" is due to scour from the top would be the natural supposition, but the author ascribes it more often than otherwise to an opposite cause—namely, that the neck has been actually built up by deposit. The seemingly frail barriers stand for many years, and finally break through in a few hours without warning. The usual process of undermining, washing out a layer of sand, becomes an immediate cause of the break. When the surface is once thus broken, the excessive slope, in an overflowing stage, plays an important part in hastening the demolition of the barriers. Active erosion is greatest when the river is well within its banks. Undermining is the most active agent, which is effectual far below the roots of trees, and therefore is little influenced by the cultivation of the adjacent lands.

THE new spire for the historical cathedral of Bern is nearly completed, after having been in the hands of the architect, Professor Beyer, of Ulm, since 1889, and costing the enthusiastic subscribers to the building fund about 14,000*l.* The committee of the "Münster-bau-Verein," in whose hands all questions of renovation and completion rest, has lately published its annual record of progress on the works, and, according to this report, as soon as the spire is finished the whole of the building is to be thoroughly overhauled and repaired, the proposed extra outlay for these improvements being estimated at 20,000*l.* This sum will, however, only cover the cost of such work as must be necessarily done if the building is to be preserved; a complete restoration, with an improvement of the immediate surroundings, requiring another 40,000*l.* That a comparatively small town like Bern should voluntarily subscribe so much for the spire and necessary repairs is so creditable to them that they might well spare the doubtful luxury of a restoration.

THE *Quarterly Statement* of the Palestine Exploration Fund contains the report of the Annual Meeting, in the course of which a resolution was passed that lectures should be delivered in London from time to time to call public attention to the work done in connexion with the fund. The number contains a series of interesting letters from Herr Schick on various objects that have been discovered during recent explorations, including some very curiously-shaped vases from tombs at Jaffa, of which illustrations are given, and which have been stated by Mr. Franks, of the British Museum, to be vases used for holding *kohl*, with which the eyebrows were painted. They consist of a small double vase with a flat handle formed in an ornamental open-work pattern, by which they were hung up. Herr Schick also gives a description and illustration of the remains of a building which he considers to have been the "Church of St. Martin," or a part of it. He also gives an account of some excavations on "Skull Hill," which has recently been said to be Calvary, and a plan of this portion of the outskirts of Jerusalem, showing the relative positions of Skull Hill, Major Conder's site of the Holy Sepulchre, and the wall of Jerusalem.

AT the meeting of the Hellenic Society on Monday, Mr. A. G. Bather, a student of the British School at Athens and a newcomer at the Hellenic Society's meetings, read an interesting paper on fragments of bronze work found on the Acropolis at Athens, and now in the smaller museum at Athens. The paper was illustrated by reproductions of drawings of the objects described, which were handed round among the audience. The ornaments or designs on the fragments are all of archaic character, presenting a curious mixture of early forms of geometric Greek (or what we now call Greek) ornament with other details of a more or less Oriental character, Mr. Bather giving a very good analysis of their peculiarities. We may observe that it would be much better, in papers of this kind, which are hardly intelligible without illustrations, if care were taken to provide a sufficient number of copies for each person present to have one. When reproduction of drawings is once made, the difference in cost between providing ten or fifty impressions is trifling, and the difference to the audience is very great. Handing copies from one person to another is a most unsatisfactory method of following a lecture which is supposed to be illustrated, and the necessity for it might easily be avoided. This is one of the details which is seldom properly managed at the Hellenic Society, where illustrated papers nearly are always attended with the drawback that only a part of the audience can have a chance of properly seeing the illustrations.

PROFESSOR GARDNER has of late years devoted a good deal of time to the study and exposition of Greek vase paintings. It has fallen to him to write the first volume of the "Museum Oxoniense," which is, in fact, a projected publication of the sculptures, inscriptions, bronzes, vases, and other antiquities belonging to the University. These, in consequence of Mr. Fortnum's benefaction, are now shortly to be brought under one roof. The "Catalogue of Greek Vases in the Ashmolean Museum" is the first issue. It is somewhat the fashion now-a-days to make the publication of a catalogue the occasion for writing a historical sketch of the subject in general. Professor Gardner has, we think, very wisely resisted this temptation. The vases of the Ashmolean collection are, as he says, both so few in number and of so few classes as to render any complete and systematic treatment of the subject in general by their aid unsatisfactory. None the less, to each class of vases represented there is a brief prefatory note embodying the very latest scientific conclu-

sions. Space forbids much detailed notice, but we may draw attention to the interesting account of the red-figured technique on p. 23. The original view expressed there is mainly based on the technical knowledge acquired by the artist who drew the plates, to whose skill and admirable fidelity of touch Professor Gardner does full justice. The book, both plates and text, is a model of what an illustrated catalogue should be, and will doubtless do much to promote the study of Greek ceramography at Oxford.

THE annual business meeting of the special delegates of the amalgamated societies of German architects and civil engineers, which was held at Münster, was well attended, some fifty representatives being present. As usual, the amount of valuable work done at the delegates' meeting was far greater than that of the biennial general gathering of members. The coming year promises to be a very busy one for the workers of the societies, if we may judge from the long programme of scientific and other researches which are to be made by the working members before next year's rendezvous in Strasburg. The delegates' work will probably soon be more regularly put before the public in the form of a proper Journal of Proceedings, and the various publications of treatises, &c., brought out under their auspices, are to be more uniform in style and appearance. A great deal of the results of valuable work is lost at present through unsystematic publication.

OUR German contemporary, the *Statistical Correspondent*, publishes a number of interesting figures relative to the population and area of the largest cities of the world. As the exact population of cities is important to those who wish to compare municipal institutions, we reproduce the following list of places with populations of over five hundred thousand:—

London	4,415,658	Bombay	821,751
Paris	2,712,508	Calcutta	810,686
New York	1,685,943	Hankow	800,000
Brooklyn	2,352,150	Tientsin	800,000
Berlin	1,685,943	Tsingtau	800,000
Canton	1,600,000	Rio de Janeiro	800,000
Vienna	1,394,513	Moscow	798,742
Hankow	800,000	Glasgow	772,040
Hanyang	800,000	Hamburg	772,040
Wutshang	1,200,000	Altona	734,625
Tokio	1,155,290	Manchester	703,470
Philadelphia	1,105,277	Salford	647,601
Chicago	1,066,830	Liverpool	636,000
Singapore	1,000,000	Futtschow	608,669
St. Petersburg	654,400	Boston	570,460
Tientsin	620,000	Birmingham	554,713
Constantinople	573,205	Buenos Ayres	554,713

FROM the last number of *L'Architecture* we find that the French architects are still occupied in discussing the question of "Le Repos Hebdomadaire," or, as we should say, the question of Sunday labour; not on religious grounds, about which there would be hopeless difference of opinion, probably, in France, but on the ground of the need of periodical rest for the labourer, whether architect or artisan. M. David de Penanrun contributes a long and well-written article on the subject, in which he strongly urges the practice of cessation from work on Sunday, on the ground of "économie sociale," as a necessary condition for getting the best work done by all concerned. The article, though only now published, appears to be a reprint of a paper read at the last Congress of French architects. It concludes with the recommendation that a special committee should be appointed to study the question and to collect all the evidence necessary to prove the utility of the measure, and the means of securing its general adoption. It was M. de Penanrun who first brought up the subject at a former Congress, two years ago.

THE fire which damaged the barracks at Chester Castle on last Tuesday morning imperilled one of the most striking

of our provincial buildings. What is now known as the Castle, and is still a royal fortress, comprises the County Hall with the new gaol at its rear; in front is a spacious court, half oval in shape, having the barracks and the armoury on its east and west sides respectively. The blocks were erected, pursuant to statutes passed in 1788 and 1807, after Thomas Harrison's designs, on the site of the old castle (pulled down two years ago), just within the south-west angle of the city wall, on a bluff of rock, along the Dee's right bank. Harrison's design is classic; the main gateway passes through a Doric order of four fluted columns which carry a massive attic; on each side is a similar but smaller tetrastyle order with an angle pediment—extending over 100 ft. in all. The inner buildings have colonnades to correspond, all the columns being of single blocks; the freestone was quarried at Manley, and the entire group took twenty-eight years in construction. There is a good view from without the gate, by C. Heath, after Geo. Pickering, in Volume I. of Ormerod's "Cheshire" (1819), with W. Finden's print, after Hollar's drawing, of the interior of "Hugh Lupus's Hall," which measured 99 in. by 45 ft. in the castle lower ward, whose site is that of the gaol. Lysons' "Magna Britannia" reproduces Randle Horne's bird's-eye view, Harl. MSS. 2,073, showing the old castle, with the bridge and its two gates, the water-tower, and mills as they appeared about 250 years ago. Of that building, said to have been built by William I., who, three years after the Conquest, gave Chester and the shire to Hugh Lupus, Count of Avranches, as defender of the Welsh Marches, little remains excepting Julius Caesar's Tower, wherein it is believed James II. heard mass when on a tour in these parts, and Richard II. and Margaret, Countess of Richmond, were imprisoned. The tower's antiquity, however, has been questioned; it has been refaced, and in his paper on the "Age of the City Walls of Chester," printed by us on August 21, 1886, Mr. G. W. Shrubsole, F.G.S., says that after very superficial examination, seeing that it is not 500 years old, it is by no means Roman, nor included within the Devan camps.

WE have received a circular from Milan calling attention to the International Working-men's Exhibition which is to be held there in 1894. The Milanese workmen send by this circular (translated into English) "a greeting and invitation to all companions in labour who are working, studying and hoping."

"They ask all working men and working women, those of the large associations in city and country, isolated working people, and all those lost in the tumult of great industrial centres, to send what they have made either in a small way or a large one, in order that they may be brought to public notice."

The circular does not make it very clear what is to be the precise scope of the Exhibition; it is divided into three sections: (1) Work; (2) Prevision; (3) Instruction. "Prevision" seems to include everything which proceeds from forethought and prudence, as it includes co-operative societies, hygiene, insurance against accidents, &c. What is included under "Work," however, is obvious enough, and probably the exhibition will mainly consist of those productions of individual workers which, as the prospectus tells us, "will be a collection of human documents on the social questions which so annoy egotists, but which profoundly interest the truly sincere." We trust that we are among the "truly sincere"; at all events we shall be very glad to hear that the exhibition is a success. Applications for space to exhibit can be made up to November 30, and must be addressed (with information as to the nature of the object and the probable space required) to "the Workmen's International Exposition Committee, Via Rastrelli, Milan." "Rastrelli Way" it is given in the English

prospectus, but that is evidently what is meant, the meaning being a little obscured in this and other instances through too direct an effort at literal translation. On the other hand we must admit that in the warning that "we must not illude ourselves," the translators have added a new and useful verb to the English language.

FURNITURE AND ORNAMENTAL IRON AT CHICAGO.

FURNITURE is one of the subjects very fully illustrated at the Columbian Exhibition, nearly every country sending contributions of one sort or another, and some of them—such as England, France, Germany, Italy, and the United States—being very fully represented. The English exhibit is one that reflects very great credit upon the country, though the display is limited to three or four firms. But each of these sends a fairly large and varied assortment, and the result is highly commendable. In household art the most important contribution is the official building of the Royal Commission, Victoria House, which has been furnished throughout by English firms, and in its public apartments contains some notable examples of English furniture. Unfortunately, this house has been closed to visitors during a large part of the exhibition, and Americans and others at the Fair have not, therefore, profited by its good points to the extent that was originally hoped for.

Though of generous size, the house is too small to permit palatial apartments, and its designer, Colonel Edis, is to be congratulated on having made such good use of his opportunities. Modelled plaster is used for the ceilings of the rooms on the first floor, those to which the public are admitted when access to the house is permitted, and with which we are chiefly concerned. That of the hall, a pleasant roomy apartment with a grand staircase directly in front of the spectator as he enters, is from one in "Pias Mawr," Conway, North Wales, and dates about 1550. The ceiling over the staircase and the principal landing is from Haddon Hall; that of the reception-room is from the banquetting-hall at Crews Hall, that of the dining or waiting room from Campden House, Kensington, while that of the library is from drawings by Colonel Edis himself, who is also responsible for most of the oak panelling in the hall and rooms, chimney-pieces, and the like. Mr. Owen W. Davis has prepared the designs for much of the furniture, though a good part of it has been reproduced after Italian models in various English country seats and foreign museums. The effect of the whole, as has been hinted, is very good, and affords an excellent illustration of the resources of English domestic art. If criticism is to be made it is that the furniture is not always consistent, and that the different models from which it has been made give rather a varied appearance to the rooms. On the other hand, this very difference adds to the reality of the effect, since in any English mansion a variety of chairs and other pieces of furniture would naturally accumulate in the course of years, and the result is, therefore, truer in this respect than if everything had been made in a single style. Still, this arrangement, notwithstanding its good points, implies a fallacy, since the facsimile of a piece of furniture is not the real thing, and in furnishing an apartment in a modern dwelling we should scarcely ransack museums to gain variety and effect. But the exhibit is a very good one, and the firms who supplied the articles may take great credit to themselves for the part they have taken in the work.

Of the furniture exhibits in the Manufactures Building the most striking is that by Messrs. Hampton & Sons, consisting of a reproduction of the Banqueting Hall of Hatfield House. It is a facsimile reproduction in carved wood and modelled plaster reduced to one-third the dimensions of the original. This reduction, while necessitated by the size of the space at the disposal of the exhibitors, and the great cost of making a full-sized copy, is justly open to criticism, since, while the hall itself has been reduced, its furniture and other contents are of full size, and the comparison is not, therefore, a just one. In other words, instead of having here a reproduction of the hall, what we really have is a room modelled after it—using the same decorations, it is true, but still a room complete in itself, without being a model of its prototype. Apart from this, the reproduction is a fine one. The furniture is partly genuine furniture, of

approximately the same date as the hall itself, and partly manufactured expressly for the present occasion, the best models only being used. As it stands, therefore, it is much more representative of an Elizabethan hall than the original at Hatfield House, which contains modern and unimportant furniture.

Messrs. Macheth & Roberts send a large collection of their so-called "medieval carved oak" furniture, chiefly actual reproductions of ancient work, but partly original designs in the old spirit. These are very well done, on the whole, though it must be admitted that to give modern furniture the texture and aspect of extreme old age, when in reality it is fresh from the factory, is not a system of procedure that is to be commended for its honesty. However, neglecting this general proposition, the firm shows a good collection, high-backed chairs, sideboards, mantel backings, and tables, all elaborately carved in designs of good taste.

Messrs. Collinson & Lock have a large display, divided into three rooms. They show a large line of inlaid cabinets, the designs being chiefly scrolls and Renaissance motifs in ivory inlaid in woods of various colours. Many of the designs are exceedingly rich and beautiful, and the display is one of the most notable of its sort in the exhibition. Among the larger articles shown a large wardrobe may be mentioned, inlaid of rosewood and boxwood. It is divided into three parts, the centre, or hanging closet, being faced with a mirror; the wings are used for drawers, and inlaid with scrolls and cherubs. They also show an elaborately carved mantel with a carved panel over the shelf. They send, further, some chairs covered with stuffs, a bedroom set in natural woods, and some inlaid tables, similar to their cabinets in general workmanship.

Messrs. Gregory & Co. send several pieces of furniture, the most noticeable of which is a large sideboard in oak, elaborately carved. The front has three carved panels of conventional designs below and above, and the flat cornice is supported by free Renaissance columns with Corinthian capitals standing at either end, and forming a very agreeable finish. A carved mantel, in which the same column feature is employed, though not so successful as the sideboard, is further represented by the English household art is further represented by the wall-papers shown by Messrs. Jeffrey & Co. and Messrs. Woolams & Co. The products of these firms are too well known to need description here, and it is only necessary to say that both displays are full and representative, and arranged with great taste. We shall not be disappointed if these displays do not give some "pointers" to the American wall-paper makers, though the finer grades of English wall-paper already have a considerable market in America. Though the United States shows some very good designs for wall-paper, we think there can be no question of British supremacy in this field. Before dismissing the subject of English household art, mention should be made of an Indian room in carved teakwood, made from designs by Mr. Lockwood de Forest at Ahmedabad. The carving is in the usual Indian style, and is very good of its kind. The windows, however, are much too small, and the room too dark for a northern climate, unless it is used as an evening room exclusively.

The Italian display of furniture is exceedingly "messy." The space is crowded with a multitude of objects that could scarcely be well seen in twice the area, and the intricacies, as it were, are so filled in with commercial statuary, pottery, and jewellery booths, all apparently doing a thriving business, and all very crowded with people at all hours of the day, that it is not only one of the most crowded parts of the Exhibition, but it is one in which it is most difficult to see anything. And when seen it is a most depressing show. Many of the designs are very bad, the outlines frequently heavy and awkward, the carving poor and insignificant, though frequently very abundant in quantity. A remarkable family homeliness runs through the cupids that dance, perch, recline, and peek from almost every imaginable place, and which is fairly astonishing when one remembers that this collection has been made in various places and is from various cities. If the furniture at Chicago is to be accepted as the best Italy is now making, the art has certainly degenerated to a commercial standard that is wholly depressing. What impression this display must make on those Americans to whom Italy is the land of Raphael and of Michelangelo, an Italy supreme in all artistic affairs, it is impossible to say, but judging from the crowds and the vast display of "sold" cards, the result seems to be highly satisfactory to American taste in general.

If so, it would have been better in the end to have suppressed it altogether.

It is quite unnecessary to review this collection in detail, for it is almost hopelessly bad, but one or two especially large pieces may be briefly mentioned. Notwithstanding the execrable taste of much of the display the general effect is very rich, so far as carving is concerned, and the very generous manner in which it has been applied. This is doubtless the key to the popularity of this section, since nowhere in the Exhibition is so much heavily-carved furniture to be seen. It has, therefore, bad as it is, a distinct and individual character of its own. One of the largest pieces is a huge cabinet in bronze and wood. The body is supported by two bronze lions and is itself decorated with bronze figures in niches. Bronze figures also support the cornice, which culminates in a clock. There is probably not a square inch of unornamented surface on this cabinet, and one's wonder at its marvellous "art" is divided with one's surmises as to what use such a construction could possibly be put.

The Fratelli Mora, of Milan, show a draped bed in green and gold, of unsatisfactory design. The wall behind the bed is decorated with panels of gilded leather. Some other furniture shown by this firm is more pleasing. Inlaid work makes up a large portion of the Italian display. It is chiefly ivory, inlaid in ebony, though some other woods are occasionally used. A number of pieces in which geometrical designs alone are used are very poor indeed, though they are without the cumbersome aggressiveness that distinguishes the carved furniture. The scroll designs are, on the whole, much more satisfactory. A number of large tables in black and white, decorated with scroll borders and ornamented with pictures in white, make a characteristic display. Some of these pictures are large and complicated, and in the worst possible taste. On the whole the Italian standard of excellence in furniture seems to be to cover the object with as much decoration as possible; whether it be inlay or carving seems immaterial, so long as nothing is left unadorned. Those who are pleased with this sort of thing will find ample opportunity for delighting their eyes in the Italian section of the Columbian Exhibition.

In pleasing contrast to the unlimited variety of Italian furniture are several small exhibits of wrought-iron work, shown by Castello Prospero, of Turin, and B. Zaltuf, of Siena. All of this is well done, a stair-rail shown by Prospero being very well thought out, and quite successful. The ornament is most judiciously applied, helping the structural parts without hiding them.

Denmark sends a few pieces of furniture of no especial merit. The general effect is heavy, and the articles are without interest. The Russian display is somewhat larger, though devoid of articles of striking merit. A large cabinet, in a heavy Russian style, and ornamented with panel pictures in burnt wood, may be mentioned as a novel piece of furniture. A dinner-table, with high-backed chairs, decorated with the Russian eagle, may be mentioned, as well as a table to be placed under a mirror, heavily carved in burnished gilt and in very bad taste. Several carved cabinets and sideboards are also shown, some of them quite large, and heavy and Russian in style.

Belgium sends a group of furniture of very unequal merit, some being fine and good, other pieces being rather heavy and coarse in aspect. The general effect of the carving, even the least satisfactory, is subdued, and notwithstanding it is not all praiseworthy, it stands in delightful contrast to the miscellaneous collection sent by Italy.

In ironwork the most noticeable object is a huge bronze vase, made by the Compagnie des Bronzes of Brussels. It is a twelve-sided vase made by the *cire perdue* process. A placard informs us that it is unique, the wax moulds in which it was cast having been destroyed. There is more comfort in this notice than its makers perhaps intended, since the design is very bad indeed, and the world could very well get along without the present specimen. A small but really fine collection of wrought-iron ornaments is shown by Prosper Schryvers, of Brussels. The work is extremely well done, and it is to be regretted there is not more of it. All the pieces are small.

No furniture is sent by Spain, but two large vases of gold encrusted on steel, made by Mme. Felipa Guisalo, of Madrid, command attention. These are very large. One is a Greek amphora, the other a large rounded vase, called, from its decoration, a Renaissance vase. This is the more successful of the two, since while Greek decorative motifs are employed on the amphora, no Greek vase was ever decorated as it is. The

artist has fallen into the somewhat natural error of unthinking people, that if Greek forms were employed in the decoration, the result would surely be Greek. As a matter of fact, no people would probably be more astonished than the Greeks of the classic period to learn that this production was intended to illustrate their own work. The Renaissance vase is illustrated with an elaborate scroll decoration of great beauty. Still, one wonders who would pay 8,000*l.* for it, or half this sum for the amphora.

The French display of furniture is very extensive, and its systematic installation—which is carried out throughout the whole French section, to the enormous advantage of the exhibits—enables it to be seen to the utmost advantage. While inlaid work predominates in the English section, and carving in the Italian, the French furniture, as a whole, is characterised by the employment of stuffs, of tapestries, brocades, and the like. There is little carved furniture, and no great merit in the forms of that which is covered. And so, while the display is rich and extensive, while many of the shapes are good, and much of the covering of more than ordinary excellence, we do not find it as satisfactory as the furniture in which the wood plays an important part. There is a good deal of painted furniture, of scenes and flowers on enameled grounds, much of it being delicate and fine, and, in its way, very good. Several cabinets and tables in this style are especially attractive. A painted bedstead may be mentioned, with green ground and finished with invariable draped canopy. Several displays are in the form of complete rooms, arranged in admirable taste, though the furniture itself is not always satisfactory. Jeanselme, of Paris, shows a reproduction of the bedroom made for Napoleon the First on the occasion of his marriage with Marie Louise. It is inlaid wood.

In iron and bronze, or rather in bronze alone, the displays are fairly large. Most of the bronze exhibits are overcrowded, and the objects lose considerably thereby. A large display is made by Thiebaut Frères, of Paris, who show, among other things, a bronze reproduction of the "La Vigne" vase by Dore. They also send two colossal bronze figures, of a man and a woman, and several large bronze groups, together with an immense assortment of smaller objects. The Société Anonyme des Hauts Fourneaux et Fonderies du Val d'Osne, of Paris, also sends a large collection, including a number of colossal figures. They make no display of their constructional iron and bronze work. Disclun, of Paris, sends a collection of wrought-iron work, lamp standards, and irons, ornaments, and the like. Most of it is coarse and without merit. More satisfactory is a collection of door hinges, knobs, door plates, knockers, &c., shown by several exhibitors. Many of these are really fine designs, and are in marked contrast to the general mediocrity of the French bronze display. Several firms send chandeliers for gas and electricity, none of which are at all satisfactory. In truth there is no disguising the fact that in this sort of work the French have scarcely maintained their reputation. Many of the articles have a cheap and coarse look that is quite unexpected.

The furniture exhibit of Germany is large and complete, thus competing in point of quantity, with that of France. And in quality it runs its rival very close, for the workmanship is of high excellence, and the designs of great merit. In some senses the German collection is the most remarkable in the Exhibition. Never before has Germany made so bold a bid for leadership in artistic manufactures, and the older countries, and especially England and France, which have long enjoyed a monopoly in this department, need to look after their laurels lest this new and somewhat unexpected competitor surpasses them. The German exhibit, as a whole, is the most complete made by any European nation, nearly every department of art and industry being represented with tolerable fulness, and with at least sufficient completeness to make it seem to be what it is, an attempt to illustrate German products as a whole. While we are only concerned with household art, it is well to note this fact, as it explains a good deal of the excellence of the German display.

The most notable part of the furniture in the German section is a collective exhibit placed in three rooms at the outer corner of the section, and occupying one of the most conspicuous positions in the building. The rooms are reached by a flight of steps, and are thus quite separated from other parts of the section. They are in the style of the German Renaissance of the sixteenth century, and are decorated and furnished with great magnificence. The first is a reception room,



A Sketch in Norwich, showing Tower of St. Peter's, Hungate (now destroyed).

The detail has been carefully worked in every particular. The ceiling is a tunnel vault, richly coffered with gold, and decorated with frescoes. Marble mosaic doorways lead, on one side, into a dining-room, decorated with embroidered stripes on the walls; the ceiling is open, showing the rafters, which are painted with a striped decoration. The chairs are of pointed embossed leather; the other furniture corresponds with the time intended to be represented. On the opposite side of the reception room is a throne room, decorated with blue velvet hangings, ornamented with gold. The furniture of the room has been lent by the Bavarian crown, and the whole is a marvel of gilding, and is exceedingly rich, though in the worst possible taste. The general effect of these rooms, however, is magnificent. The furniture is rich and effective, and the whole reflects great credit upon its originators. After this brilliant display the other exhibits of furniture necessarily suffer somewhat by comparison. Most of them are arranged in rooms, every detail of which is perfectly given. Thus a small room of the Munich Collective Group, arranged by the architect Seidl of that city, is furnished, carpeted, papered, and curtained by a variety of firms and individuals, each of whom contributed his own specialty. Of the other displays mention may be made of a reception room shown by J. L. Distelhorst, of Karlsruhe; a drawing-room set, of which the chief feature is an over-ornamented cabinet, by Groschkus, of Berlin; an old style dining-room, with a large and charming settle, by S. Schneller, of Munich; some leather chairs, cabinets, &c., by M. Venbauer, of Munich; some very good embossed leather furniture and screens by G. Hulbe, of Berlin, and some Arabic furniture, far from pleasing, by J. C. Otto, of Nuremberg.

In iron work the most notable exhibits, and indeed the most notable objects of their class in the Exhibition, are the great wrought-iron gates by the well-known firm of Armbruster Gebrüder, of Frankfurt-on-the-Main. These form part of the boundary walls of the German Section, being utilised as the chief approach. The gates are three in number, with sufficient rail between them to give the three a due proportion. The ornament is foliated decoration, and while much too rich and complicated over the gates, is itself very well applied to its purpose, and the whole is a noble and important piece of work. This firm also has an exhibit of smaller pieces of wrought iron, most of it very complicated, but of good general

excellence. E. Puls, of Berlin, also has several gates, but in size and workmanship they do not compare with the splendid ones of Armbruster.

On the whole, notwithstanding some obvious shortcomings, this display of Germany is most commendable. It shows a thorough command of technique in the production of objects of applied art. But there is a riot in many of the designs, a heaviness in the furniture, a waste of splendour in many of the lesser objects, that needs to be corrected and repressed before German art can take a place beside that of France and England. That it is forging towards the position held by these countries is very evident from its exhibit at Chicago, and in view of the efforts Germany is putting forth in this direction it is not likely it will fail to take advantage of the lessons of comparison that must be forced upon its people by its present contact with the best work of Europe and America.

The American display of furniture, as, might naturally be expected, very large, firms from all over the country being represented. On the whole it is very satisfactory. It is characterised by a use of natural woods, though some examples of enamelled, gilt, carved, and inlaid furniture is included in it. There is no promiscuous carving, such as may be seen in the foreign sections; all that is used is extremely judicious and sufficiently subdued; and while the furniture sent by non-American exhibitors is designed for the rich and is throughout luxurious in intent, that shown by the Americans is apparently intended for the well-to-do middle class, who make, of course, the larger amount of furniture purchases. But while the American families, on the whole, are of this description, it is very good furniture indeed that is made for them, and it is most admirably suited to its purpose, not only in being a furniture that is very good and may be had at not too high a price, but furniture that is thoroughly artistic and possessed of many inherent merits of workmanship and design. There is a great deal of satisfaction to be obtained in plain, solid, useful-looking furniture, and it is this that attracts one in the American section. One of the most interesting phases of the exhibit is the generally high excellence of the designs, irrespective of its place of production. It thus happens that quite the Far West as comes from the East. A uniform standard of excellence in furniture distributed over so wide an area as the United States contains most hopeful suggestion for the future.

In decorative art, to go a little beyond the

bounds of our present subject, the most striking American display is that made by the Tiffany Glass and Decorating Company, of New York. This firm makes a specialty of stained glass and ecclesiastical decoration, and its exhibit is one of the most noteworthy in the Exhibition. Its main feature is a chapel, decorated in the most elaborate manner and provided with altar and baptistery. The chapel is small, and is chiefly lighted by electric lights within it. Special mention should be made of an electrolier, in the form of a double arm cross, with green and white glass of very rich effect, though the amount of light received from it is not very great. The altar, of white mosaic, and a delicate and exquisite piece of work, with a richly jewelled and enamelled tabernacle, stands under the recessed archway. The columns are of glass mosaic, of good pattern, though the detail is quite lost in the dark room in which they are shown. The capitals are gilded, as is also the stonework of the arches. These are decorated with a good design, somewhat coarse in detail, and quite in keeping with the Romanesque style in which the chapel is designed. Behind the altar and under the arches is a stained glass window through which, however, owing to the location of the chapel, no light at present comes. To the right is the baptistery, consisting of a font with a richly decorated cover standing under an arch, with a stained glass window. The effect of this room is extremely rich and very impressive, though it certainly is in the worst possible taste to place lighted candles on the altar, and thus add to its church-like effect. This gives an artificial air to the place, which detracts considerably from one's enjoyment of this novel and interesting work of art.

A NOTE AT NORWICH.

It is to be regretted that the Norwich people do not take better care of their ancient buildings; probably, as the saying is, "familiarity breeds contempt," and they think that it does not much matter if one or two of their thirty-six interesting churches disappear from time to time. We do not know how else to account for the destruction of the old church of St. Peter, Southgate, and the pretty tower of St. Peter's, Hungate. The former piece of mischief can hardly have been rendered necessary by disrepair, because the church had been restored a few years back, so that if it really was unsound, it ought not to have been allowed to get into such a condition, for, if money was forthcoming for re-seating and other ornamental

works, it was clearly the duty of the authorities to see that necessary structural repairs were carried out before ornamental ones.

We remember going into another church at Norwich some four or five years back, which had just been extensively "restored," (?) and the water was pouring through the roof in bucketsful. We know that this sort of thing happens too frequently.

"Restoration committees" are so anxious to see something for their money—a brand new set of varnished deal benches instead of the old-fashioned pews, a new reredos, or a stained-glass window—that the architect who wishes to please his clients is too often tempted to spend the money on such things instead of commencing his work by rendering walls sound and roofs weather-proof.

The church of St. Peter, Southgate, stood in a very picturesque situation on the slope of a hill, rising somewhat abruptly from King-street and crowned by a fine fragment of the city walls, with a great round bastion tower. The church was for the most part Perpendicular, but had fragments of earlier work about it. Its destruction seems to have been very short-sighted, because Norwich is throwing out a large suburb between Trowse and the bank of the river Wensum, and when this is built over the pretty little Medieval church of Trowse will be insufficient to supply the spiritual wants of the neighbourhood; so either a new church will have to be erected, or the characteristic little village church spoiled by additions not contemplated in its original design.

With regard to the other work of destruction, pulling down the tower of St. Peter's, Hungate, it does seem strange that the small sum necessary for its structural repair was not forthcoming.

The church is one of those pretty aisleless cruciform buildings, several examples of which occur in Norwich, notably St. Mary's and St. Michael's at Plea, a plan which would seem to lend itself admirably to modern requirements, as it provides an undivided nave of wide span for congregational purposes, from which a chancel and two small transeptal chapels open out. In Anglican churches one of these would offer an excellent position for the organ and the other a baptistry or, where used, a "morning chapel." The tower is at the west end so that the building has no "crossing." Like most of the Norwich churches, St. Peter's Hungate is Perpendicular; the tower, which was a simple example of the style, was embattled, and had a two-light window in each face. Though not a remarkable example of architecture, yet it formed the centre object of the picturesque group of Medieval buildings shown in our sketch; to the right was the fine east window of the old Dominican church, now St. Andrew's Hall; in the centre is a picturesque street, with gabled houses, and tower of St. Peter's Hungate, rising up at the end, and to the left was a very fine old Gothic house, with projecting stories. It is of no use, according to the old proverb, "to grieve over spilt milk," and, of course, nothing can bring us back these old works after they are once destroyed; but we do sincerely hope that the Norwich people will see their way to prevent the continuation of such destructive practices, as it is sad to think that ancient buildings, which have escaped so many dangers, should be handed down to our time to be destroyed or mutilated. It would, however, be unfair to the Norwich people not to mention the fact that the choir of the great Dominican church, the east window of which is shown in our sketch, was, chiefly through the exertion of Mr. F. Oddin Taylor, then sheriff, secured by the Corporation, and by them put into a good state of repair, without in any way impairing its archaeological value. We trust that in future the Norwich people will follow this example, instead of those to which we have previously alluded. H. W. B.

THE ARCHITECTURAL ASSOCIATION.

The opening meeting of this Association for Session 1893-4 (which was also the annual general meeting) was held on Friday evening, October 13, in the meeting-room of the Royal Institution of British Architects, 9, Conduit-street, the President, Mr. E. W. Mountford, occupying the chair.

Vote of Thanks to the Retiring President.

The minutes of the last meeting of last session having been read and confirmed, on the motion of Mr. E. Woodthorpe, M.A., a vote of thanks was carried by acclamation to Mr. H. O. Cresswell, the retiring President, for the able manner in which he had discharged the duties of his office during the past session.

Annual Report, &c.

On the motion of Mr. E. S. Gale, seconded

by Mr. E. Woodthorpe, the adoption of the annual report, which is printed on page 149 and following pages of the new "Brown Book," was agreed to. The report states that the Committee held 36 meetings during the session, that 72 new members were elected, and that the losses by death, resignation, and other causes amounted to 71, leaving a net increase of 4, the total number of members being 1,129. The Committee is pleased to record the most encouraging progress of the new Educational Scheme. Divisions I. & II. have again been well supported, and Division III. has shown a marked improvement, while the attendance in Division IV. gives evidence of a desire amongst students to take up the more advanced subjects. The Committee regrets the further falling off in the attendance at the ordinary meetings, and thinks it desirable that the whole matter should be taken into consideration at an early date, with a view to discover, if possible, some means of increasing the popularity of these meetings.

Mr. Hampden W. Pratt, hon. treasurer, then moved the adoption of the balance-sheet for the past session, and in doing so proposed a vote of thanks to the auditors, Messrs. Bernard Dicksee and G. A. Lansdown. The balance-sheet shows an expenditure for general purposes of 1,737*l.*, a sum of 21*l.* in excess of receipts. These included 698*l.* 7*s.* 6*d.* for members' subscriptions, 172*l.* 4*s.* for entrance-fees, and 795*l.* 17*s.* for students' fees. The Premises and General Fund account shows donations amounting to 238*l.* 16*s.* 9*d.*, and after meeting the deficit of 21*l.* already mentioned, the cost of furniture, &c., a balance of 554*l.* 7*s.* 4*d.* is carried forward.

Mr. S. B. Beale, in seconding the vote of thanks to Messrs. Dicksee and Lansdown, said, that with regard to the expenditure of 145*l.* on their last *conversazione*, he should seriously like them to consider whether they were justified in spending a quarter of their income upon what he might call amusements. And with regard to the last *soirée*, they were given to understand that the money paid for the tickets of admission would pay for the expenses, but the Association was put to an expense of over 40*l.* in connexion with that entertainment. Again, in last year's accounts they had an item of about 15*l.* as a donation to the library fund—he could conceive of no more laudable donation—but this year there was no such donation, but an item of 12*l.* to the dinner fund, and he thought that this was not a step in the right direction. He trusted that the new Committee would see their way to economise in the expenditure on the forthcoming *conversazione*.

Mr. Pratt having briefly replied to some of Mr. Beale's remarks, the adoption of the balance-sheet was agreed to, and the vote of thanks to the auditors was carried unanimously.

The Conversations.

Mr. F. T. W. Goldsmith, senior hon. sec., announced that the annual *conversazione* would be held on the 27th inst.

A list of forty-two gentlemen nominated for election was then read.

Prize List, Session 1892-3.

The list of prizes awarded during the past session was also read, some of the prizes being presented. The list was as follows:—

Lecture Side: Division I.: Silver medal to Mr. T. E. Abbott; bronze medal to Mr. G. B. Hoole; hon. mention of Mr. A. H. Allan. *Division II.*: Silver medal to Mr. C. de Gruchy; bronze medal to Mr. E. P. Wheeler; hon. mention of Mr. C. A. J. Sharman. *Division III.*: Silver medal to Mr. A. Stedman; bronze medal to Mr. A. G. Bewes; hon. mention of Mr. H. C. Lander. *Division IV.*: Silver medal to Mr. W. K. Shirley; bronze medal to Mr. M. G. Pechell; hon. mention of Mr. F. H. Mercer.

Studio Side: Division I.: First, Mr. T. F. Green; second, Mr. T. E. Abbott; hon. mention of Messrs. A. M. Sinclair and L. Shuffrey. *Division II.*: First, Mr. C. A. J. Sharman; second, Mr. T. N. Diawiddu; hon. mention of Messrs. J. W. Hoult and C. de Gruchy. *Division III.*: Silver medal to Mr. C. C. Brewer; bronze medal to Mr. M. F. W. Bunney; hon. mention of Messrs. J. P. Clark and P. F. Hockings. *Division IV.*: Silver medal to Mr. W. C. Waymouth; bronze medal to Mr. A. E. Henderson; hon. mention of Mr. A. T. Griffith. *Measured Drawings Prize*: Awarded to Mr. T. F. Green.

The Association Medal: Awarded to Mr. W. B. Dawson.

The Andrew Oliver Prizes: First prize, Mr. A. J. Stratton; second, Mr. A. J. Roddis.

The following prizes were not awarded: *The A.A. Travelling Studentship*; the *James Brooks Prize*; the *Architectural Union Co.'s Prize*; the *Discussion Section Prize*; and the *Essay Prize*.

The President said that with regard to the Association medal it would be remembered that Mr. Gilbert had promised to model a new one for them, but from a letter recently received from him it appeared uncertain when the medal would be ready. Under these circumstances the committee thought it desirable to award the existing medal rather than wait an uncertain length of time for the new one.

A. A. Camera Club.

Mr. F. T. W. Goldsmith said that he had received a letter from Mr. Francis R. Taylor, the hon. sec., about a new club which had been started in connexion with the Association, and which was called the A. A. Camera Club. The object of the club is for the cultivation and advancement of architectural photography, and it aims at obtaining photographic records of old work, &c. The President is Mr. J. L. Robinson, R.H.A. The subscription has been fixed at 5*s.* a session, and membership is limited to members of the Association.

The President's Address.

The President then proceeded to deliver the opening address of the session as follows:—

In departing from what I believe to be time-honoured precedent, and giving the Presidential Address before the *conversazione*, the Committee have, as always, considered your pleasure and advantage; feeling rightly that if we could but get this thing off our minds first you would be able to enjoy the entertainment at Princes' Hall free from care and the haunting shadow of the address to come, while I have the satisfaction of believing that my shortcomings to-night will be forgotten and forgiven in the pleasure of our meeting in Piccadilly. Since my predecessor addressed you from this place, another session, with all its labours and anxieties, hopes and fears, has gone to swell the past history of the Association, and our educational scheme, as to whose failure or success there was so much difference of opinion, has come triumphantly through the test of another twelve months' working. Indeed, its early success has been more complete than its original founders dared to hope, and may now be said, for good or evil, to be completely established. To many of us the new departure was by no means a source of unalloyed satisfaction; it seemed to be too great a breaking away from the old traditions of the Association, too complete a reversal of the system under which our past had been so successful, and in connexion with which so much good work had been done. But the old classes, pleasant and profitable though they were to both visitors and members, had grown so large as to become unwieldy, and it was moreover felt that the instruction they supplied was neither thorough nor extensive enough to meet present day requirements. Therefore, the change had to be made, and two years of steady work have placed the new arrangement of Studio and classes on a firm foundation.

Turning to the Report of the Committee, it will be seen that the number of our members was increased last session by only four, but it is right to explain that the small increase was greatly due to a severe examination of the roll, and the removal therefrom of a good many names which should have been omitted before, their owners having, for some time past, ceased to be profitable members of our body, and it is satisfactory to add that of our 72 new members 52 joined either the classes or the Studio. With regard to the classes, I am pleased to be able to say that the attendances increased in each of the four divisions, excepting the first, in which there was a slight decrease, and that the classes in Division IV., which from want of members had previously not been held, were for the first time called into existence. Most of the extra subjects also show improved attendance, especially the class for the study of Quantities and the Elementary Water Colour Class, the number of students in the former having risen from 16 to 34, and in the latter from 9 to 35. While mentioning the Quantity Class, I should explain that it is not the intention of the Committee to make the instruction given in this class such as is necessary to qualify a man for becoming a quantity surveyor, but only sufficient to give the more elementary knowledge of the subject which it is desirable and proper for all architects to possess. To me the source of the greatest satisfaction is the fact that in each division of the Studio there is an increase of students—an increase moreover which would probably have been greater, but for the very limited amount of space at our disposal. This want of space has been a constant trouble

to the Committee, but so far our efforts to obtain larger and more suitable premises at a rental within our means have been quite unsuccessful.

It is to be regretted that the class for modelling does not prove more attractive to our men. There are, in my opinion, few subjects more important for a young architect to take up, and I sincerely trust that in the near future this will receive the increased attention it deserves.

Of the students who took up the "full course" of instruction in either classes or Studio in both Sessions, 1891-92 and 1892-93, thirteen who worked in the classes in the first division in 1891-92 moved into the second division last Session, two moved from the second division into the third, and four from the third division into the fourth. Some students who worked in the classes in Session 1891-92 took up the Studio in Session 1892-93 and *vice versa*, evidently with a desire for change, while some students who took up the full course in 1891-92 took up only special subjects in 1892-93. It is to be hoped that as time goes on the numbers will materially increase of those who work systematically through the whole four years' course, taking up the classes of each division in turn, for it is only thus that the best results can be obtained from the course of instruction provided. It is this gradual progression that the Committee desire, for we are entirely opposed to cramming, our object being to prepare the student, as far as possible, to properly carry out the work that may be entrusted to him in after life, and not to merely enable him to pass any examinations, progressive, qualifying or otherwise, held by any examining body, either established or to come. This point cannot be too strongly insisted upon. If we can, by the work in our classes and Studio, our lectures, the papers and discussions at the ordinary meetings, our organised visits to ancient and modern buildings, our prize competitions, and all the other means at our disposal, fit our men to become in due time decent architects, we shall have done something considerable, and they will probably find it not very difficult to pass any examination likely to be required of them; but to merely prepare them for passing any such examination is not our aim. Nevertheless, we maintain that any student who desires to pass the examinations now held by the Royal Institute of British Architects will do much better and attain much more lasting results by going systematically through our course of instruction, than by cramming for the purpose under any coach whatsoever, no matter how talented he may be. All experience proves that knowledge gained for the special purpose of passing an examination, usually in the shortest possible time, by the process known as cramming, is lost even more rapidly than acquired, leaving the unhappy subject of the process in a worse state, both mentally and physically, than before. Our curriculum, originally prepared with the greatest care and modified from time to time as experience suggested, is now as perfect as we know how to make it. Our lecturers and instructors are able men, selected for their special knowledge of the subjects they undertake, and it is not too much to say that every architectural pupil should at once join our school, where he will be able to acquire knowledge to be obtained in no office.

But although our progress is generally satisfactory, the Committee have still one cause for regret—the continued bad attendance at our ordinary meetings. Possibly it is too much to expect men after working all day in various offices and four evenings each week in either the Studio or classes, to give up another evening to attend these meetings, especially when we remember that considerable preparation is necessary for most of the class work. But for every one who can do so it is most desirable that he should make a point of attending the meetings as often as possible. It is quite a mistake to suppose that as much benefit can be obtained from reading the papers when afterwards published in the professional journals as by attending the meetings. Most of the lectures are illustrated by numerous drawings or photographs, and many by choice specimens of various materials, stone, wood, or metal, as the case may be, and still more interesting examples of skilled workmanship in these materials, from which and from the lecturer's replies to questions or points raised in the debate, the most valuable information is to be gained, which cannot, of course, be conveyed by the reports in the journals, admirable though they be. A knowledge of materials and the proper manner of treating them is often lacking in young architects, who do not realise, for instance, that oak requires different treatment from deal, cast from wrought-iron, and so on. Three, at least, of our

papers this session will be illustrated by examples such as those to which I refer, namely, those on "Hard Wood Joinery" by Mr. Barnes, "Wood Carving" by Mr. Diamond, and "Wrought Iron" by Mr. Longden, the lecturer in each case being in an unrivalled position for procuring objects for exhibition, worthy of your best attention. The subjects of all the papers are such as can be confidently recommended to your notice, being not only good in themselves, but written by men who understand them and how to make the papers interesting. Our first paper, by Mr. Beresford Pite, is of special importance, being an introduction to the course of lectures on "Practical and Beautiful Design" which he has promised to give us at Great Marlborough-street, and as to which I need only remark that such of you as desire to be present had better come early, there being no reserved seats. One other point as regards our ordinary meetings should be mentioned as being a novelty, which is, that the Discussion Section has very kindly undertaken to provide for two evenings during this Session, on which occasion they will have the control of the general arrangements, and something lively in the way of a discussion may be anticipated. When I say lively discussion I do not suggest that Parliamentary precedent will be followed, and broken heads ensue, but simply that there will be plenty of speakers prepared to say all they know and, possibly, a little they do not know, upon the selected subject.

May I hope that our efforts to make these meetings attractive will be appreciated, and that your appreciation may be indicated by your better attendance.

For the present our project of starting workshops in which students might gain some general knowledge at least of the various crafts allied with architecture, is under a cloud. We have not the means to carry out our wishes in this most important part of our scheme. While various moneyed philanthropists are wandering about London erecting libraries, museums, picture galleries, &c., for the so-called working men and other comparatively affluent classes, no one is anxious to provide for the necessities of the poor architects. The whole of our modest requirements could be carried out satisfactorily for a paltry 5,000*l.* or so, and no better investment for a man who seeks no interest could be found.

One of the features of last session was the attempt by the Committee to induce Messrs. Norman Shaw and T. G. Jackson to act as visitors to the Studio, which resulted in a conference between the latter gentleman with some of his friends and the Committee. Unfortunately, no good results followed, for while the Committee had endeavoured to meet the views of Mr. Jackson by making various alterations and omissions in the "Brown Book" of that year, in order to make quite clear the point upon which I have before remarked, that our course of study is not intended merely to prepare men for passing the examinations of the R.I.B.A., that gentleman and his friends required still further assurances on the subject which the Committee did not feel able to give.

No one regrets the failure of these negotiations more than I, and I have the additional cause of regret that an alteration in the date of the conference referred to prevented my attendance. It would have been good for our students could we have secured for the Association the co-operation of such men as Mr. Jackson and Mr. Reginald Blomfield in the work of the Studio, but I think the Committee went as far as they should in their endeavours to arrange this, having regard to the absolute necessity of the Association maintaining its complete independence quite unimpaired.

The Association as a body has no business with what may be called the politics of the profession, and has no intention of taking part in them. Our one object is the furtherance of architectural education, and we accept gladly any assistance in the work that we can obtain; but the quarrel, or misunderstanding rather, between the Institute and the body of gentlemen who, for want of a better name, are known as the Memorialists, is no concern of ours, much as we regret it as a probable cause of harm to the Art, Profession, or Trade of Architecture. But it would be wrong to overlook the fact that the Institute, collectively and individually, has given most liberal support, both pecuniary and otherwise, to our school, and this absolutely unconditionally. Had there been any attempt on the part of the Institute to attach certain conditions to its offer of help, we should probably have promptly, if regretfully, declined it; but it is to be noted, to the Institute's credit, that its assistance was given freely and without any bargaining whatever, herein contrasting

favourably with the offers received from the Institute's opponents.

The case for the Memorialists, if I may so continue to call them, is set forth at considerable length in their book published last year under the title of "Architecture: a Profession or an Art," containing thirteen essays written by various gentlemen, some of whom know a great deal about architecture, and some of whom do not. Its authors, being who they are, the book, of course, is clever and interesting, one which all young architects would do well to read, and from which they could derive much profit and but little harm. But the enthusiasm for the art of architecture, so admirably expressed therein, is marred by the bitterness and, in some cases, unfairness of the attacks upon the Institute, its examinations, and its professionalism. In their eagerness to decry all these authors go too far, so spoiling their case and doing our Trade very much harm in the sight of the public, by whose favour we most of us live, and who had previously none too flattering an opinion of our calling.

Much capital is attempted to be made out of the words of the present respected President of the Institute, that an ideal architect must be an artist, a constructor, and a man of business, but I do not believe that Mr. Anderson ever said or implied that a successful architect may be a man with only one, or possibly two, of these qualifications, nor that by a man of business he meant a man the bent of whose mind is commercial rather than either artistic or constructive. Mr. Anderson's description of the qualities required for an ideal architect is indisputably true. He put the artist first and would be one of the last men to deny that this is far and away the most important, in fact, the essential part of the architect. But it is obvious that an architect must be a constructor, and if he be not more or less of a man of business also, his client is likely to find his services exceedingly expensive, and may be landed in some awkward predicament, whereby he would not be pleased, and the architect would eventually, if not immediately, suffer.

One essayist makes Professor Kerr say that being "a house agent or a land-jobber or a number of other things" may entitle a man to membership of the Royal Institute of British Architects, which, of course, neither Professor Kerr nor anyone else who knows anything of the subject, ever did or could say.

The remark, also, concerning the Institute's examination, attributed to our old Vice-President, Mr. Farrow, that "as a matter of architectural education the preparation for it is perfectly useless," is one which was obviously impossible for a man of his known views to have made.

Another writer makes what he admits to be a startling assertion, namely, that "the artist who can delineate the beauty of the human form and who is scientifically conversant with its structure as a machine, is possessed of a power limitless as Art itself. He can design a picture, make a statue, or build a cathedral." If the exhibitors at Burlington House and other fashionable afternoon resorts may be called artists, there is something very startling about this assertion, for not one in ten of these painters can draw a cottage correctly, and probably not one in a hundred could make a respectable drawing of a cathedral, to say nothing of building one, a somewhat more difficult task.

These are blots upon an otherwise delightful work, and it is a pity that the unfair methods of attack referred to should have been adopted, for there are plenty of quite genuine grounds for adverse criticism about the Institute without having recourse to word-twisting and statements which are not founded upon fact.

The chapter upon "Ghosts," by Mr. Prior, is one which every Fellow of the Institute ought to be forced to read, and if his story about the drawings which lately came before a Society accompanied by a note from the architect apologising for their meagreness on the score that his "Gothic clerk had the influenza" is not true, it ought to be. But surely the encouragement of "Ghosts" is not peculiar to architects; one hears strange stories about some sculptors in this connexion.

One point upon which most of those who so vigorously abuse the Institute agree, is in their support of the Academy; and this seems curious, for the latter body stands as much in need of reform as the former. It does even less for Architecture, utterly neglects the crafts, and ever commits the great sin in these gentlemen's eyes of enrolling surveyors amongst its numbers. This being so, how is the Academy better than the Institute?

Upon such a question as that of the Institute

examinations opinions must need differ very greatly. It seems clear that in many respects the institution of the examinations must have beneficial results upon those who properly prepare for them, and at the worst it cannot do them much harm. The mere passing is certainly not a proof that a man is a thoroughly qualified architect, in whose hands the designing of buildings, both great and small, may be left with security, and if the public be led to think the reverse then it will probably be bad for architecture. Personally, I am inclined to agree with those who would prefer to call it an "examination in building," or some similar title, for though as at present constituted it is probably a fair test of a man's knowledge of materials, sanitation, specification writing, &c., that part of it which relates to design appears to be very much in need of great modification or abolition. In one detail it has been improved recently, namely, in the regulation by which the subject for the "Design" is announced some few days before it has to be worked out. This is a step in the right direction, presuming that the design is supposed to be made under conditions approaching as nearly as possible to those of ordinary practice; for even an examiner himself would not (I hope) sit down and make a sketch for a building at a moment's notice, without any previous thought or preparation whatever. To examine in design at all is, of course, very difficult, if not impossible. It is not, however, difficult to test whether a man has arrived at a reasonable degree of proficiency in the designing of buildings, or whether he understands somewhat of mouldings and details generally; but even this requires to be done much more carefully than at present. At the last examination (I think) the subject set was "A Country Inn;" and in six hours, or thereabouts, the candidates were required to produce plans of three floors, two elevations, a section, a block plan showing position of stables and some details. The whole thing is manifestly absurd. If drawings had been supplied, the candidates might perhaps have been able to trace them in the time, although this is not certain, but to make a satisfactory design and illustrate it by all the aforesaid drawings in the time allowed, is a feat beyond anyone's capability, and the thing is altogether bad as encouraging merely rapid draughtsmanship rather than thoughtful design. Apart from this, the subject seems quite ridiculous as a test of a man's knowledge of architecture, and the condition requiring three floors made it funnier than it would have otherwise been. Until more time can be spared for the subject of design it appears obvious that the only course is to set a subject that requires no time to be spent in planning, such as one bay of a large building or complete elevation of a small one in $\frac{1}{2}$ -in. scale, with simply as much of plans and sections as may be necessary to explain the construction, together with some of the principal mouldings drawn full size. This might fairly be done in the time allowed, previous notice of the subject having been given, and would be a far better test of a candidate's power than requiring him to make an impossible number of $\frac{1}{2}$ -in. scale drawings of some quite utilitarian building, of which the plan is the most important feature. This subject of design and the attaching of too great importance to the history of architecture, seem to be the principal defects in the examination as an examination, and one comes to the conclusion that there is advantage to the students individually in the direction of their efforts to a definite end, that the subjects embraced by the examinations include those most important for an architect to understand, and that without some such object as the passing of the examination many men will not take the trouble to work at all on certain subjects which are more necessary to be known than interesting to learn.

Should the preparation for the examinations prevent or deter a man from sketching and measuring existing buildings, or perfecting himself in drawing generally, then it is doing him harm. But a man of any industry or ability can do all this and still prepare for the examinations, and such preparation properly undertaken (cramping being avoided) will be of much use to him whatever the effects may be upon architecture. I am told that countrymen generally do best in the examinations, and, if this be so, it proves there is some advantage in provincial quiet, and the absence of the various amusements and other rivals of hard work which exist in London.

An objection sometimes made against the examinations is that they induce men to enter upon the calling of an architect who would not otherwise do so, and who have no special aptitude for it, in the belief that by passing the examina-

tions they will have qualified themselves for undertaking architectural work. In any case, however, there will always be numbers of so-called architects who in no way deserve the name, and it is very difficult to understand why some of them join our ranks. To the right man no work can possibly be more delightful than that of an architect—indeed, I can imagine none so delightful. But there is a tremendous amount of it to be gone through before any degree of success can be looked for, much drudgery and much consumption of the midnight oil, and to a man whose heart is not in his work this must induce not only weariness of the flesh but of the spirit also.

For these reasons no man should dream of becoming an architect unless he loves the work for its own sake and looks for little reward beyond the pleasure to be derived from doing it to the very utmost of his ability. Few architects make money, even the incomes of the most successful being less than those of thousands of retail tradesmen, while titles and dignities are not for us. When a large public building is opened by Royalty, honours are showered upon all connected with it excepting the architect, whose name may or may not appear in next day's account of the ceremony along with those of the lesser officials. This is not as it should be or as it used to be, but it will not trouble the true architect who has had the delight of seeing the work grow under his hand from day to day, watching every moulding in the building as it is worked in the mason's shed, and who regards the whole thing as a child of his own and loves it accordingly.

To him it is always a sad day when, a building being completed and opened, his official connexion with it comes to an end, but it still remains his child, and his interest in it never ceases.

Supposing a young man to have made up his mind to be an architect come what may, and presuming therefore that he possesses the necessary enthusiasm and fondness for the work; to him I would say, never mind whether Architecture be an Art or a Profession. Let them who concern themselves on the matter call it a Trade if they will, that is no concern of yours. Your one and only aim must be to do your level best in whatever work comes to you, putting the best that is in you into any building you may be fortunate enough to get, be it large or small. If buildings do not come your way at first, and they probably will not, take whatever may come, even though it be dilapidations, light and air cases, or the much despised but quite necessary sanitary work. Some will tell you that architects should have none of these things, amongst whom are the authors of the book to which I have already referred. A paragraph in a recent number of the *British Architect*, purporting to describe how an engineer had to be called in to alter all the sanitary arrangements in a house designed by one of them, tends to show, however, that it is not every architect who can do this sort of work, and how we all get more or less of a bad name in consequence.

As to dilapidations, I know of no more instructive work for a young architect who has good eyes and brains, for nothing gives him a better insight into the causes of work going wrong, the materials requiring to be used, and the right manner of using them, to prevent similar failures in his own buildings. Never believe that doing this sort of work will do you harm or prevent you designing a building well when the chance occurs. Be ashamed of nothing except bad or dishonest work, and whatsoever your hand findeth to do, do it with your might. You will still have leisure to perfect yourself in more artistic work, and if you do not soon get the sort of work to do that you like, you might do worse than go in for a competition.

Then, again, you will find numerous men who proudly avow that they have never competed for anything in their life. You may be pretty sure that such men belong to one of two classes; either they have sufficient without the trouble of competing, or they keenly appreciate the fact that they would stand no chance of being successful if they did. Of course they do not say this; and of course there are exceptions even to this rule.

At any rate it is good practice for one with superfluous leisure—and what young architect just commencing practice has none—for even though he be unsuccessful time after time, he should learn much from each failure, and probably, if his heart fail not, will come in first eventually.

The advantage to young architects in occasionally competing lies not only in the opportunity it affords them of improving themselves in design,

but in the study of existing buildings of the same kind, which is necessary if they desire to be successful. Considerably more is learnt from a close inspection of one building with a definite object in view, and knowing the particular points upon which information is desired, than from visiting half-a-dozen under ordinary circumstances. Then, supposing the young architect to have failed at first, as of course he will many times, he has still the opportunity of comparing his design with the successful one, and noting the different arrangement of plan and treatment of elevations. It does not follow that the successful design is perfect, or anything like it, and the young competitor must use his own judgment in forming his opinion as to what are its good points and its defects, so that he may not reproduce the latter while overlooking the former.

Of course I shall be told that the whole system is bad, and that Architecture suffers in consequence. This may be true, but I cannot see it; for although bad buildings chosen in competition can be pointed out, there is no denying the fact that worse can be shown which are not the result of competition. Competitions in art matters are no new thing, having existed for centuries, and often been the means of producing charming work. In the recent past they were open to much objection from the manner in which they were conducted, and of course something remains to be desired in that respect yet.

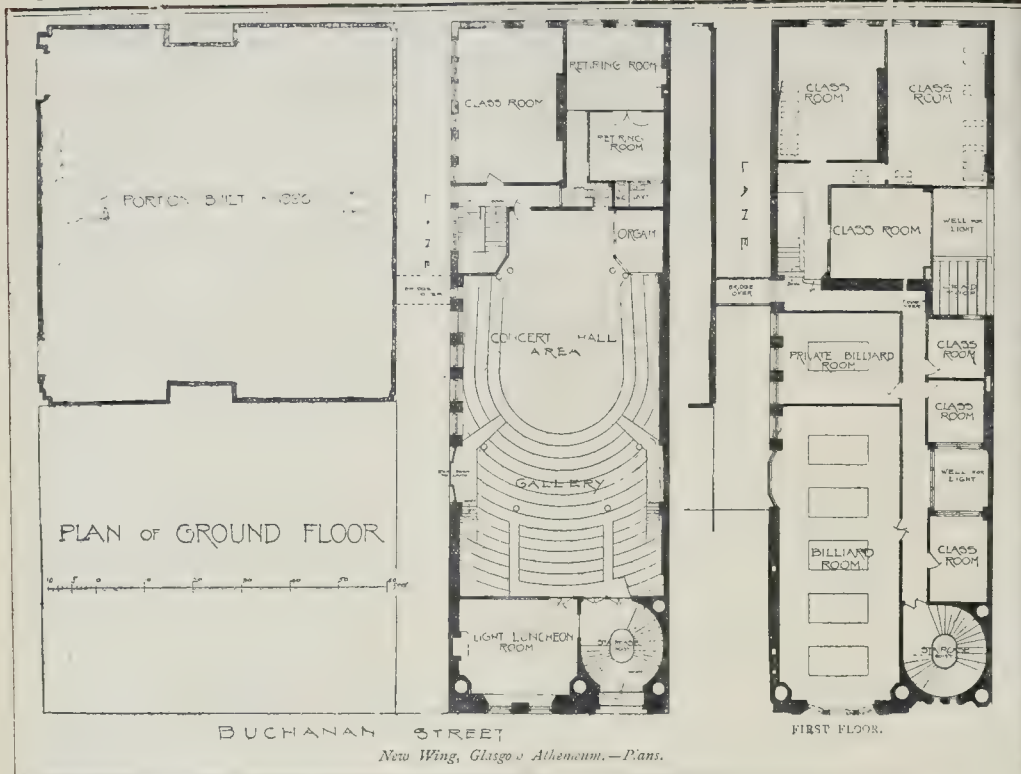
But taken altogether competitions are generally very fair now, and with professional referees of good reputation, there is seldom much room for fault-finding with the decisions. Of course, to be of any use, the referee must be a man of ability and of undoubted integrity, and, this being granted, one can always accept the award without murmur, even while possibly not agreeing with it. It is a different thing altogether when one hears, as I have, of the design sent in by the successful competitor being prepared under the direction of the referee, and in his office. For the truth of this I have the evidence of the man who actually made the drawings, and, just to relieve your minds, may mention that the referee was not an architect, but a member of a kindred calling.

In old days, before referees were usual, the committees, even with the fairest intentions, were not unfrequently led away by pretty drawings, and highly elaborated and coloured perspectives. One of my former principals told me with glee of his having won a competition for a large group of almshouses by depicting them as in a snowstorm with red-cloaked old ladies scuttling in out of the wet. But we have changed all that now, and in a competition under proper conditions I see no harm whatever, while they have the great advantage of giving opportunities to young unknown men who otherwise would probably have never been heard of. I am strongly of opinion, however, that in all competitions each competing architect should have to formally declare that the design is his own, and that all the drawings have been made by himself and his ordinary assistants, and in his own office.

Registration is a subject upon which much is being said just now by certain people; but I believe you will all agree with me that it is undesirable, and that no good could come of it, but the contrary. It is carrying professionalism a good deal further than the Institute even desires, and the pretence that registration has for its object the protection of the public is too shallow to deceive anyone. It would possibly give a certain standing to a great number of so-called architects, who at present are without it, but this would be distinctly bad for art, and so far from protecting the public, would only deceive them by putting a half-mark upon spurious metal. Every architect of any reputation or ability objects to being registered; it is only the man who has neither who desires to be branded as an architect lest the public should not otherwise recognise that he be one. Indeed, the whole cry seems to have been got up as an additional means of self-advertisement by a society which shall be nameless, but which hopes to supplant the Institute by such means and a low subscription. Like all other forms of professionalism, registration would, in endeavouring to improve the lot of the architect, be distinctly detrimental to architecture. Fancy sculptors or painters deigning to be registered.

The object of the Association is the improvement of modern architecture, and in time we shall succeed. The art of Architecture, the greatest of all arts, may be in a bad way, but it is better than it was, and modern English work compares favourably with that in other countries. It would be very much better if the public were not, as a rule, utterly incapable of appreciating the differ-

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Illustrations.

THE GLASGOW ATHENÆUM.

THE illustration, from a drawing which was hung in the Royal Academy Exhibition of this year, shows the front of the Glasgow Athenæum, which, as indicated in the plan, is an addition to a block previously built, and with which it is connected by a bridge on one of the upper floors. The back portion of the new block consists of some extent of old premises, which were acquired and then rearranged and refitted internally.

The front of the new portion towards Buchanan-street, which forms the main architectural interest of the building, is treated in a very bold and original manner, both in main composition and in detail, especially in regard to the tower-like portion which marks and emphasises the position of the staircase.

The concert-hall and theatre is intended partly for performances by the students of the school of music connected with the Athenæum (which we gather is an educational establishment and not a club in the ordinary sense). It holds about a thousand persons, and, like the rest of the building, is lighted by electricity. On the floor above is a billiard-room and class-rooms.

The system of heating and ventilation forms a special feature in the internal arrangements. The air, before being introduced into the building, is passed through a filtering screen and purified from all dust particles, fogs, or other extraneous matter. It is then passed through steam-heated coils of piping, where it is raised to the required temperature, relieved from all superfluous moisture, and passed on to rotary fans, by which it is propelled into ducts or channels leading to the several apartments of the building, and discharged through ornamental gratings, so placed as to secure an equal distribution throughout the apartment. The areas of the inlet gratings have been so determined that the current of air may be reduced to a velocity which is almost imperceptible, while the gratings are fitted with regulating louvers, by which the currents may be diverted in any direction found to be most comfortable to

the occupants of the apartment. While the primary object of the steam heated coils of piping is to raise the temperature of a cold external atmosphere, provision has been made so that the same coils of piping may be utilised for the circulation of cold water in order to reduce the temperature of a warm or sultry external atmosphere when necessary. Two distinct plants of machinery and main ducts have been put down, one being specially reserved for the requirements of the concert hall. Flues for the extraction of vitiated air are placed in the most effective positions. In the concert hall provision has been made for the introduction, by the aid of one fan only, of a volume of purified fresh-heated air equivalent to 1,200 cubic feet of air for each person per hour, or otherwise equal to a volume of air 15'80 times the cubical contents of the hall per hour. The whole scheme has been devised and carried out by Messrs. James M'Cormack & Sons, Glasgow.

Entrance to the hall can be gained, not only from Buchanan-street, but from the St. George's-place portion of the Athenæum, where there is crush-room and cloak-room accommodation, there are also cloak-rooms and lavatories adjoining the area and gallery entrances to the hall. The platform is so arranged that it can be adapted either for concert or theatrical purposes.

The architects are Messrs. J. Burnet, Son, & Campbell, of Glasgow.

DESIGN FOR END OF BATH-ROOM.

This design, made by Mr. E. H. Temple for Messrs. Maw & Co., and exhibited at this year's Royal Academy, is an attempt to make wall design in tiles and mosaic which should be less commonplace than the ordinary style of bath-room wall-tiling.

A good deal of the effect of the design depends on the colour, which of course cannot be represented here. The frieze and its pendants are in sienna green on a white ground; the figure panels in burnt copper (pale) and sienna greens on a deep cream ground, the mosaic in copper greens on golden and sienna lusted backgrounds.

The executed design, in conjunction with an encaustic mosaic floor, formed part of Messrs. Maw & Co.'s Chicago exhibit.

THE BISHOP'S THRONE, EXETER CATHEDRAL.

No English Cathedral possesses so imposing a Bishop's Throne as that at Exeter, and there are few specimens of fourteenth-century wood-work that can rival it. Buried in brown paint and varnish, it was not until its restoration by Sir Gilbert Scott about 1870 that its beauties were revealed.

There are entries in the Fabric Rolls which not only fix its date, but also mention the price paid for material and labour.

In 1312 a charge is made for 'timber for the Bishop's seat, 6*l*. 12*s*. 8*d*.', and four years later, 4*l*. is paid to Robert, of Galmeton (Yeaington?), 'for making the Bishop's seat by contract.' There is also a charge of 1*l*. 10*s*. for painting, traces of which were discovered at the restoration."

When the size of this vast and exquisitely carved canopy is considered, the cost of just 12*l*. seems surprisingly small, even for those days.

It is placed on the south side of the choir in the fifth bay from the east, and rises to the springing of the clearstory windows—a height of nearly 53 ft. It is square on plan, about 10 ft. across, and the whole canopy is supported on four solid corner posts.

The drawing is of a finial and crockets to a canopy—a row of which occur just above the stone base to the throne.

SIDNEY K. GREENSLADE.

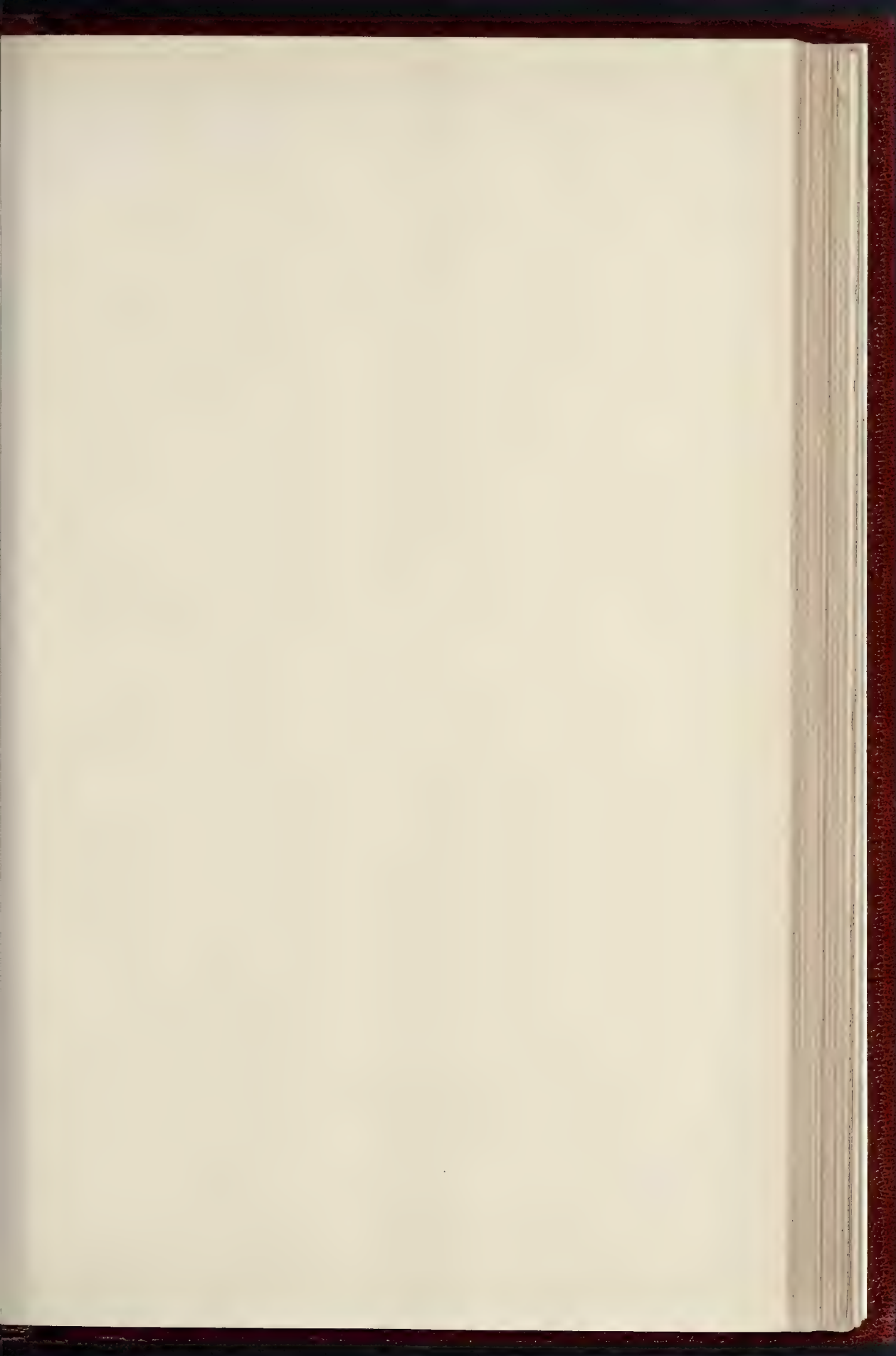
GAMEKEEPER'S LODGE IN THE ARDENNES.

This lodge has been erected for H.M. the King of the Belgians upon his estates in the Ardennes, and is constructed throughout with local materials. The walls are faced with blue stone rubble, with white stone dressings, and the roof covered with stone slates. The accommodation comprises sitting-room, gun-room, kitchen, &c., and four bedrooms.

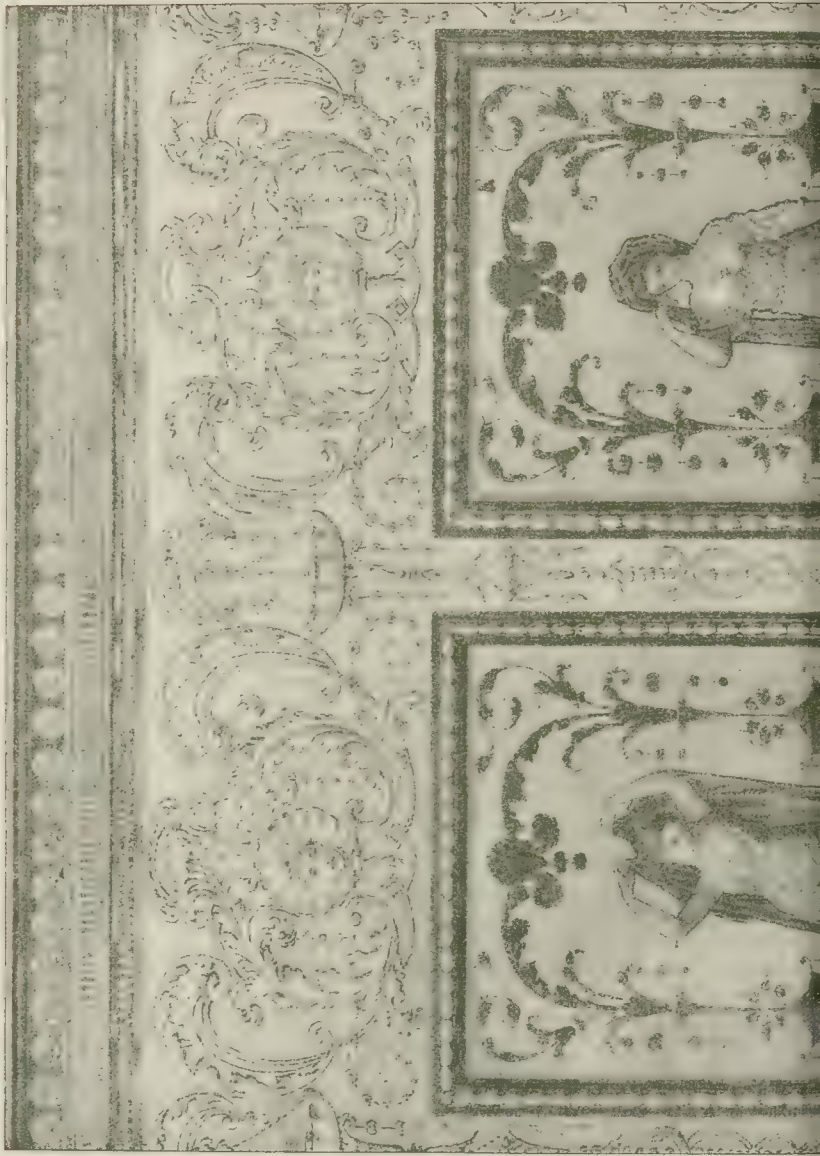
Messrs. Kidner & Berry are the architects; the work was carried out entirely by foreign workmen.

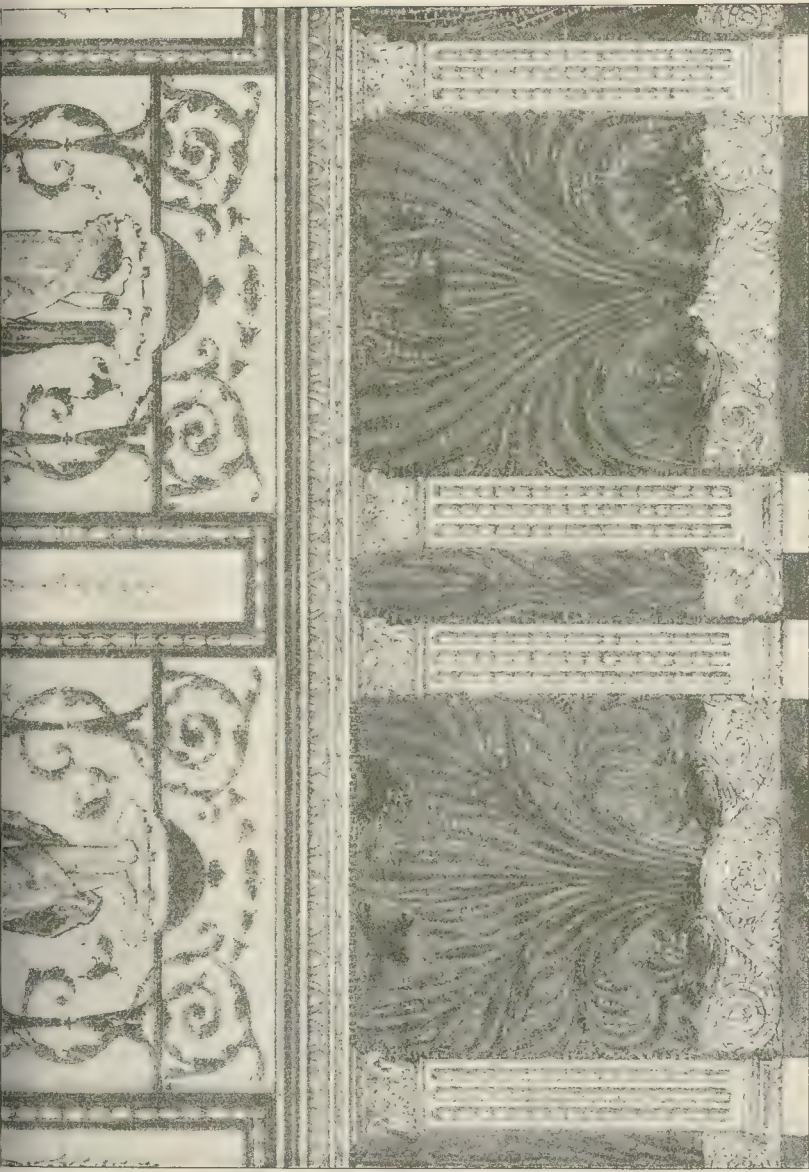
The drawing was exhibited in the Royal Academy Exhibition this year.

* Archdeacon Freeman's "History of Exeter Cathedral."



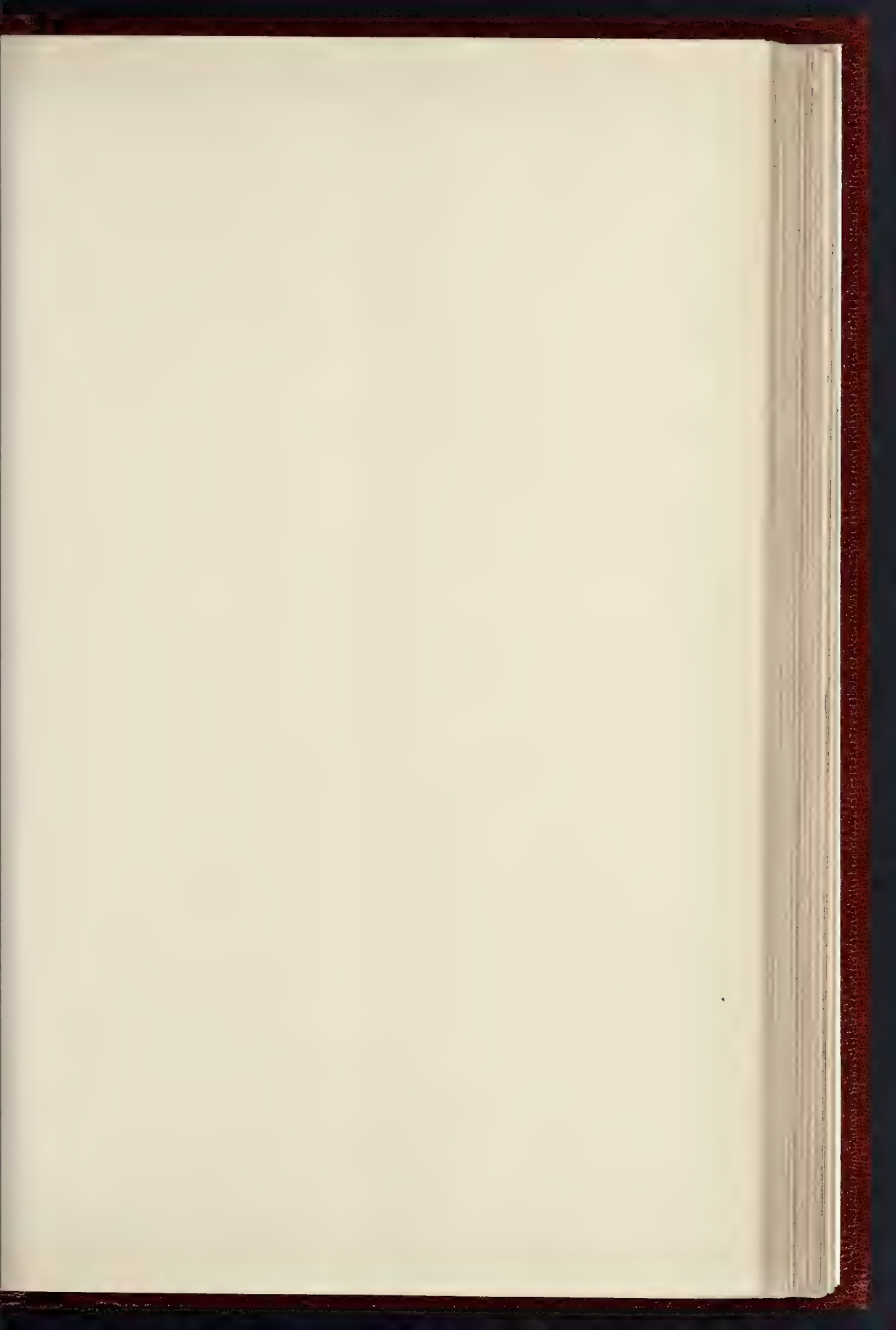
THE BUILDER OCTOBER 21 1903

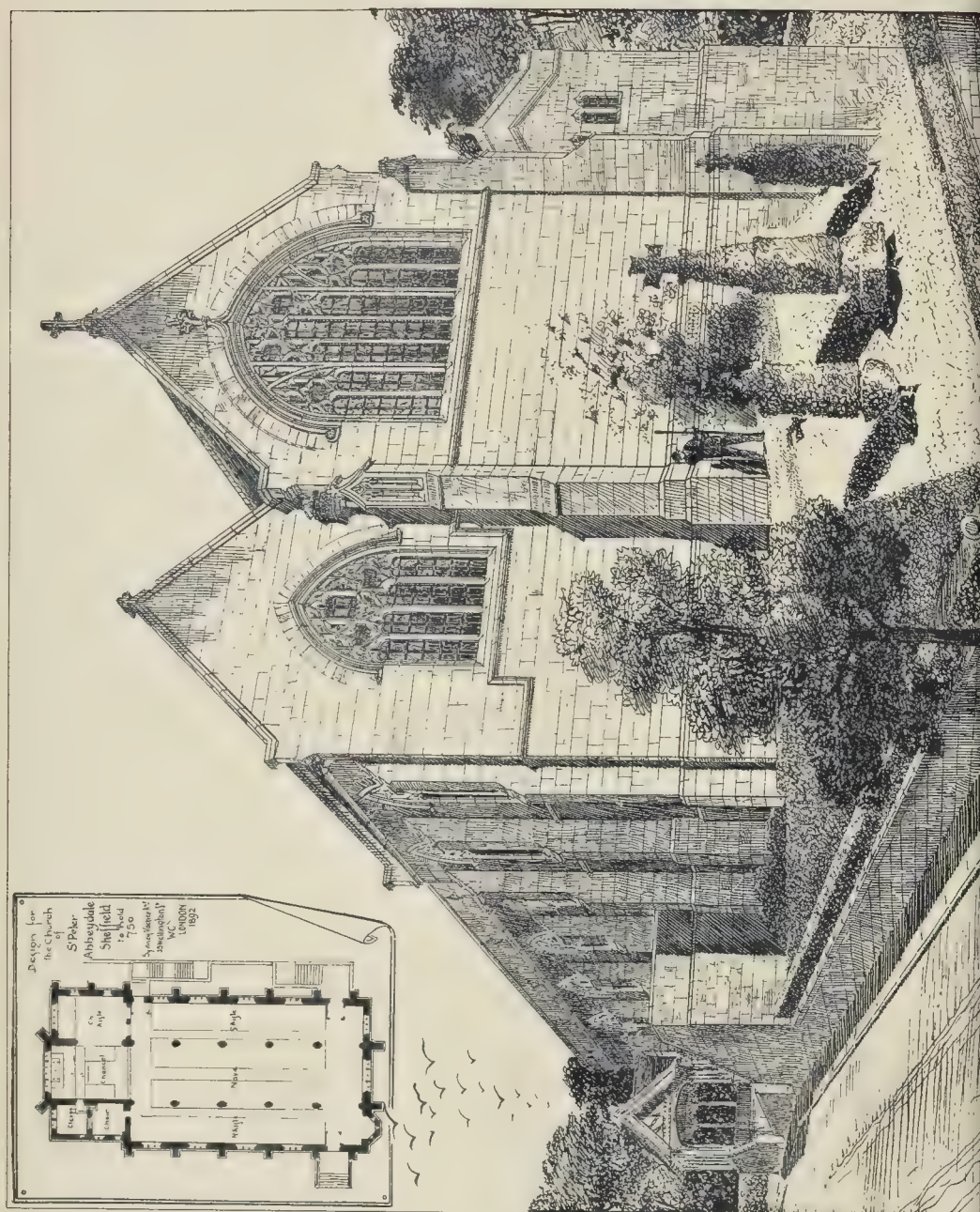


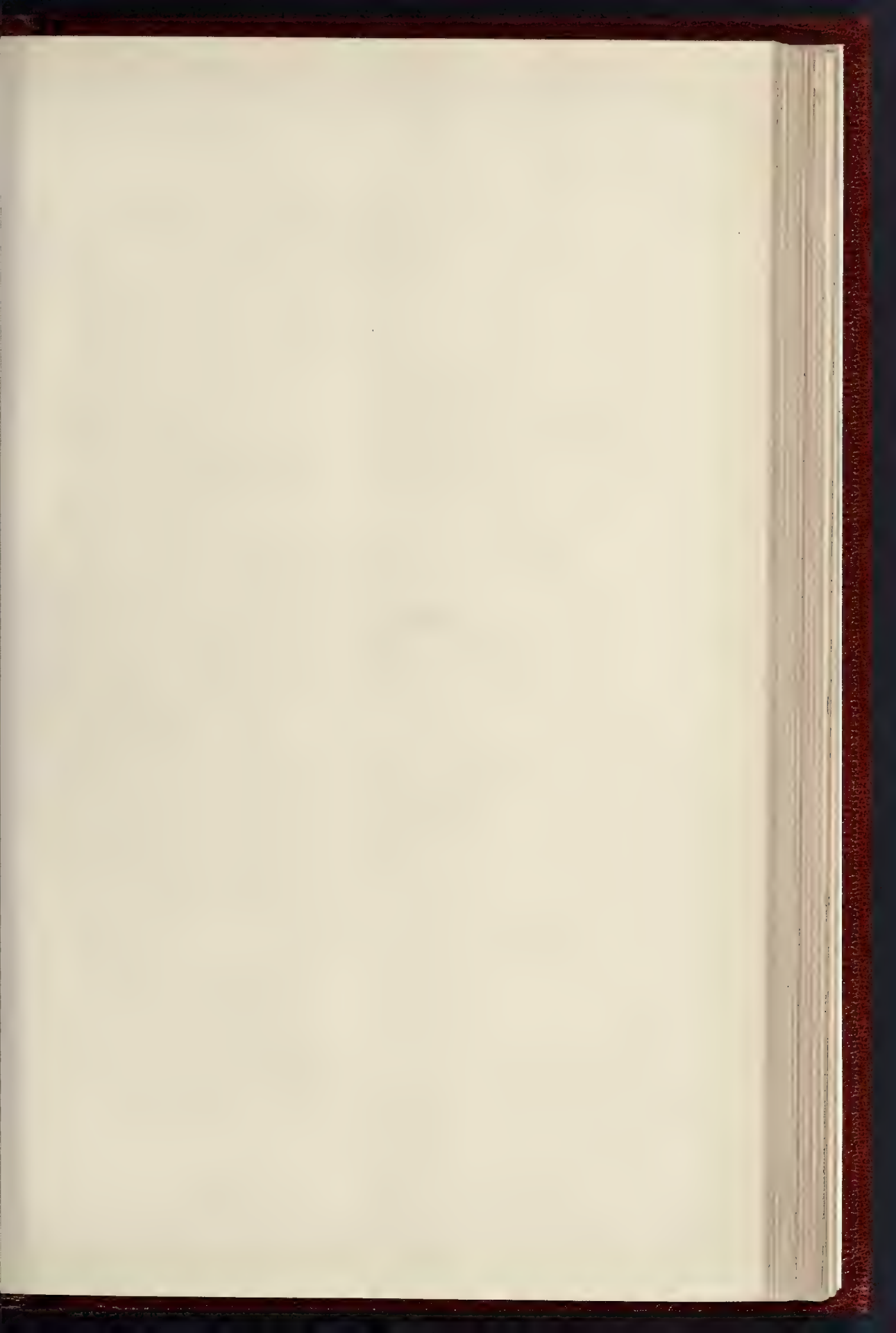


END OF BATH ROOM, IN HUT'S MOSAIC AND FAIENCE DESIGNED BY M. CHARLES TENNIE

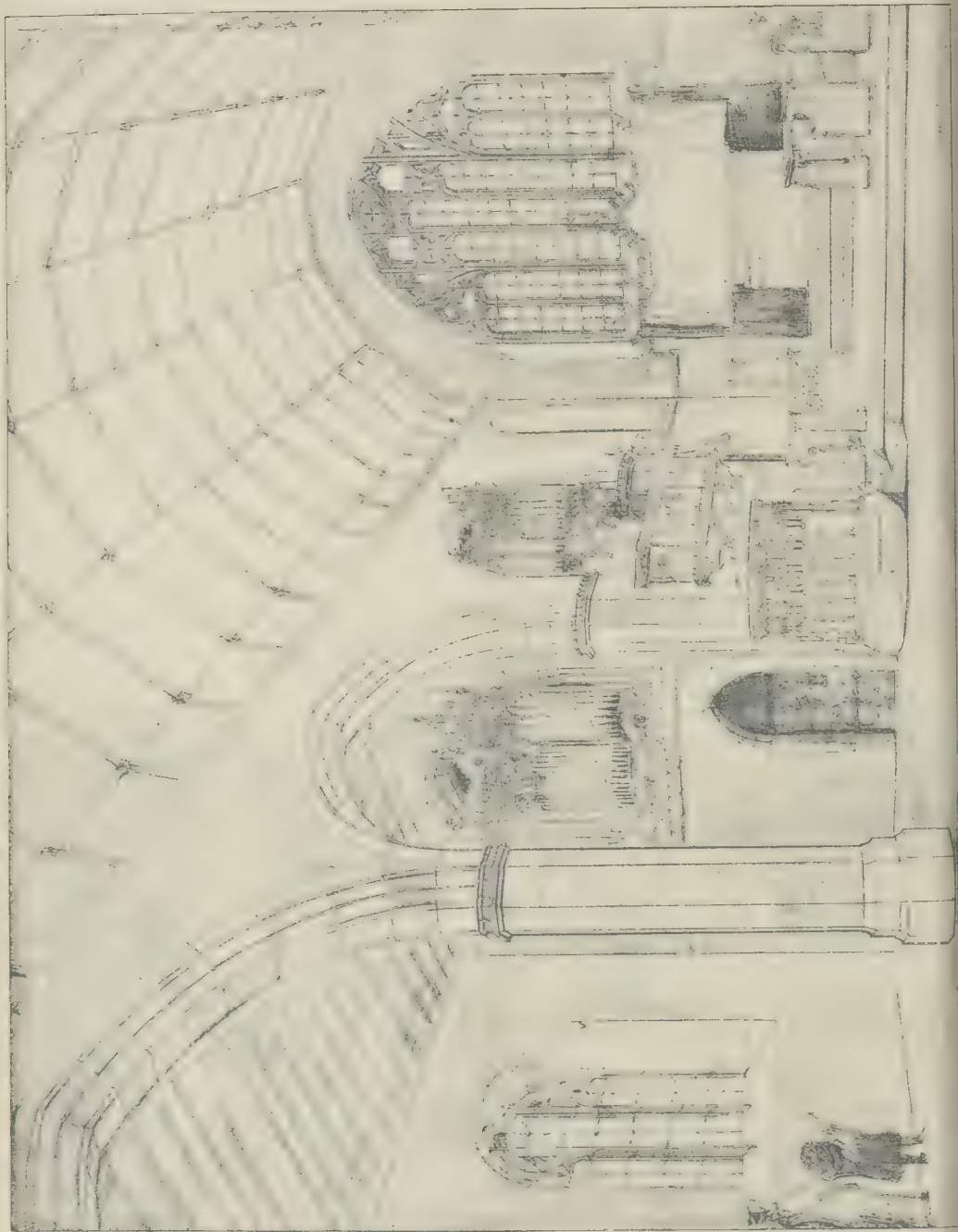
Royal Academy Exhibition, 1893



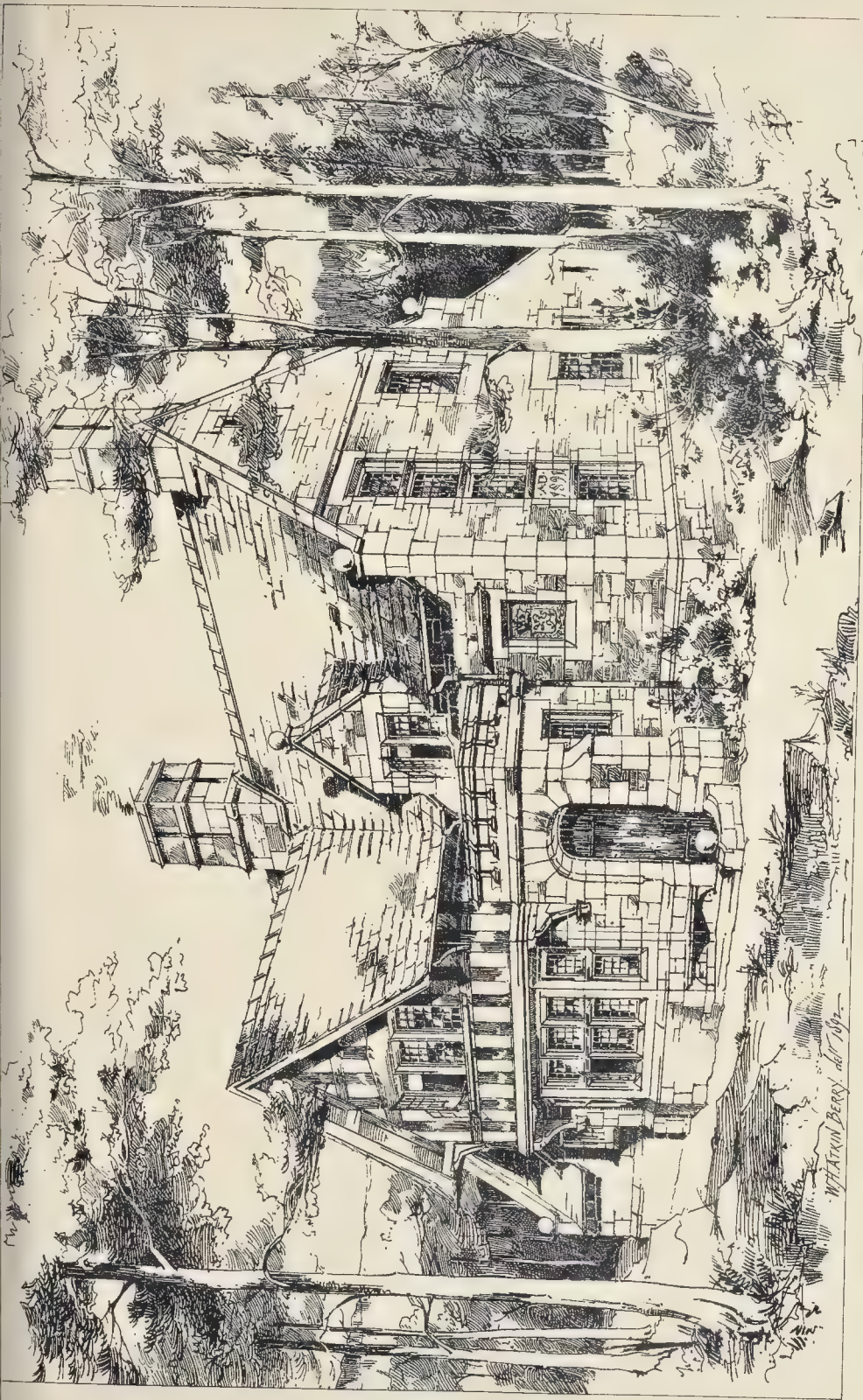




THE BUILDER OCTOBER 21, 1911



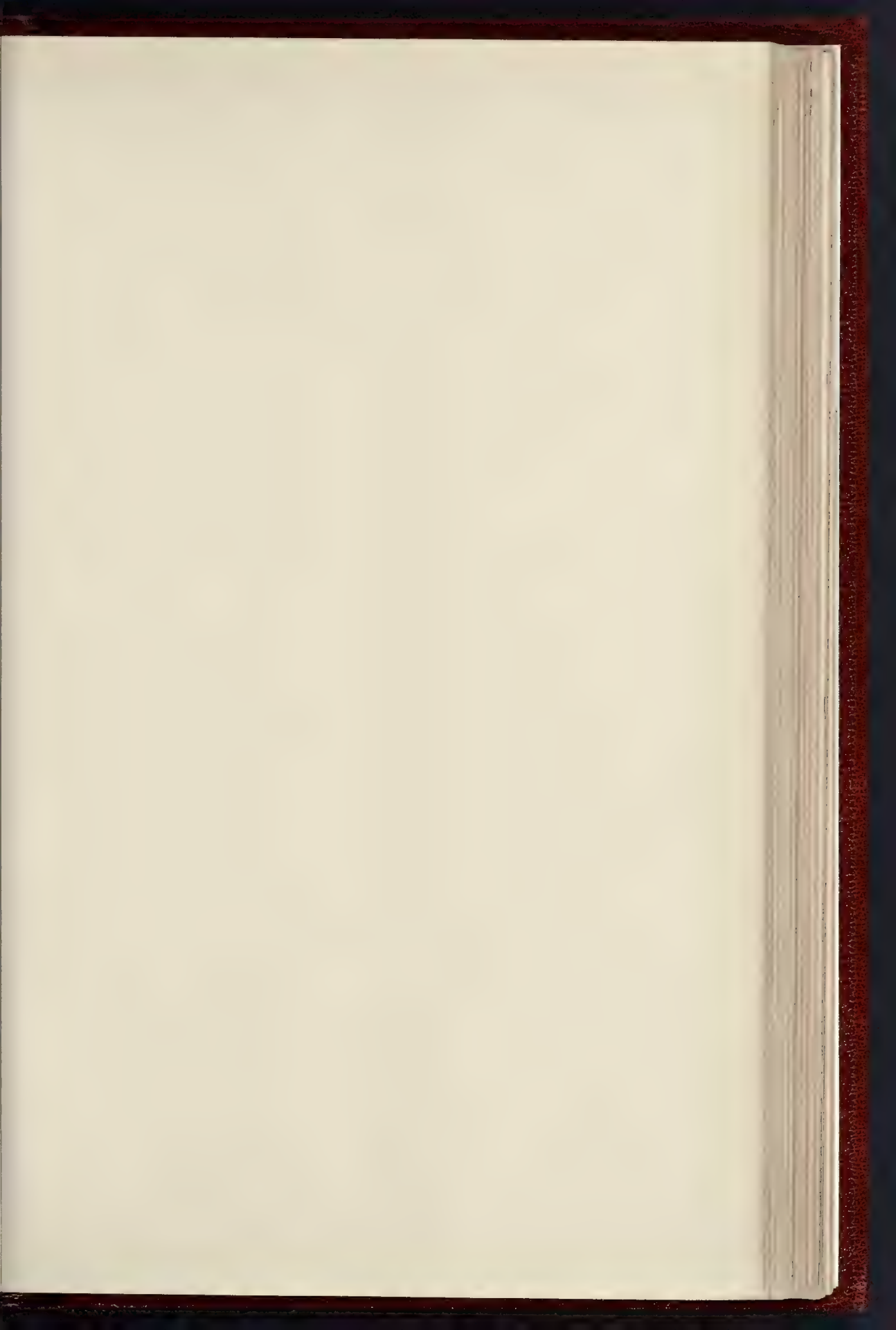




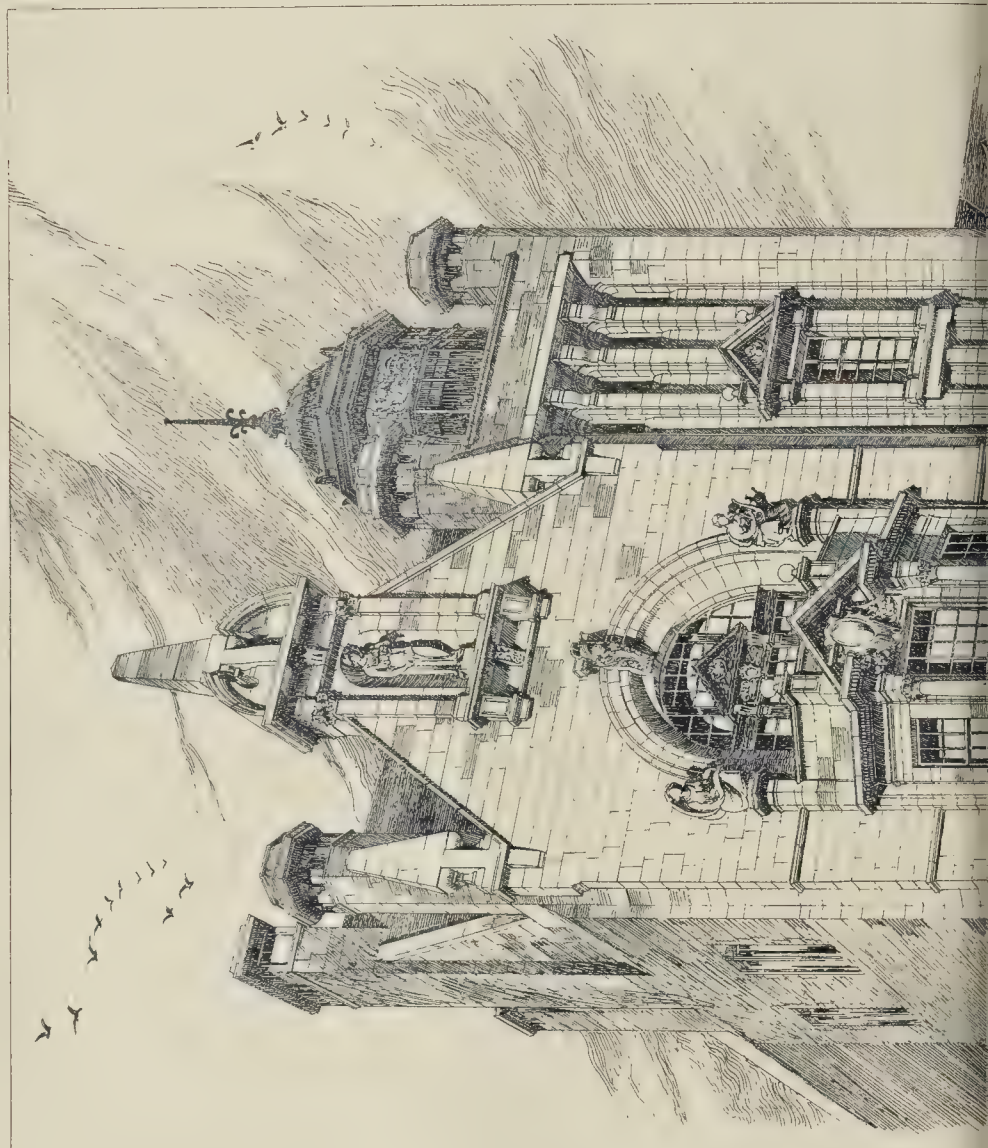
Royal Academy Exhibition, 1893.

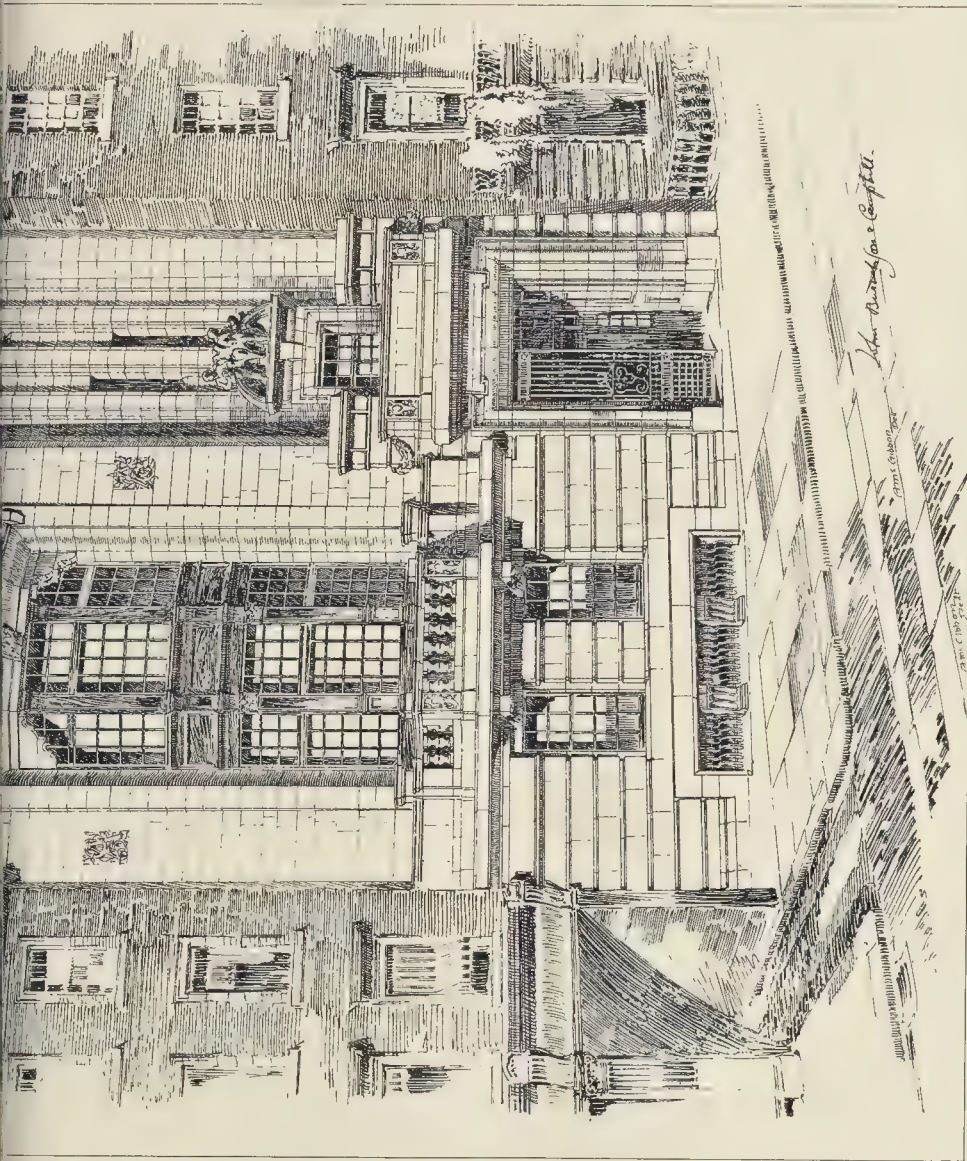
GAMEKEEPER'S LODGE IN THE ARDENNES - MESSRS KIDNER & BERRY, ARCHITECTS

W. H. KIDNER & BERRY, ARCHITECTS, 10, BEDFORD SQUARE, LONDON, W.



THE BUILDER, OCTOBER 21, 1893





GLASGOW ATHENÆUM: FRONT TO BUCHANAN STREET.—MESSRS. J. BURNET, SON, & CAMPBELL, ARCHITECTS

THE ARCHITECTURAL ASSOCIATION.

Continued from page 301.

ence between good and bad work, but there are signs of improvement even in this respect. Without doubt there are architects capable of producing work equal to anything ever done in this England of ours, but they do not get the chance. One of the principal reasons for the inferior buildings one sees in every direction is the desire of those who pay for them to have as much ornament as is possible for the money rather than good honest work. This is a difficulty which does not affect painters or sculptors to anything like the same extent, but even they have to pander to the public want of taste, and make pictures or statues such as they would not otherwise, but such as will sell.

As the public taste improves, so will architecture, sculpture, and painting, and it is improving, though very slowly. So in time we may hope to arrive at a better state of things, and have more buildings of which the country may be proud, built solidly, of the best materials, and enriched with the finest sculpture and paintings, for to produce noble buildings all the arts must work together.

Our share in the good work of hastening the result may be small or great, but if we are united and work together, every man doing his best, our influence for good must be considerable, and you should never forget that the future is in the hands of the young men.

Gentlemen, I cannot claim that any of my remarks are either "new or original," except in the same manner that our popular dramatists so name the plays which they have adapted from the German or French; they are simply my views upon matters connected with our art, and you will doubtless treat them with just the amount of respect they deserve. I have ventured to speak to you as young architects, and to give such advice as my own experience has suggested as likely to be of use to you. Much that I would have said has had to be omitted, still more has not been so well expressed as I should have wished. My views may be wrong, but at least the advice and my desire to be of use to the Association is thoroughly sincere.

Mr. J. Macvicar Anderson, President of the Royal Institute of British Architects, said he must thank them for their courtesy in inviting him to that meeting, and permitting him to propose a vote of thanks to the President for his inaugural address. He ventured to think that he could, perhaps, do so with greater cordiality than most of his hearers, because he knew from experience what the delivery of such an address meant to them. It meant the sacrifice of much time, and it also meant considerable anxiety on the part of a nervous man as to what influence his words were likely to exercise for good or for evil. Their President had completed the function which devolved upon him in a manner which had been creditable not only to himself, but worthy of the President of the Association, and the knowledge of that would not lessen, but increase, the sense of relief, which he, no doubt, felt at having delivered his address. The President had touched upon so many subjects which were of interest to the architect as well as to architectural students, that he (the speaker) would not attempt to follow him through each part of his address. But he could make one or two passing remarks. First, he must express his extreme satisfaction that their educational scheme had come triumphantly through the test of another twelve months' trial. The success had been more complete than anyone had hoped for, and the scheme might now be said to be completely established. But it did not surprise him that success had attended their efforts, for he did not share the feelings of doubt and misgiving which some had felt at their bold undertaking. Fortune favours the brave, and he had always admired the courage with which they had entered on their great work. Their object, which had been expressed by the President as "the promotion of the education of the architect," was so good that he could not but believe that it would meet with success, and it was gratifying to learn that out of twenty-two new members no less than fifty-two had joined either the classes or the Studio, and that on each division of the Studio there had been an increase of students—an increase which would have been greater but for the fact of the limited space at their disposal. But they had done a great deal, and it must be remembered that one must walk before one could leap. The difficulty

concerning the want of space which troubled the Committee would, if they had patience, and as their scheme developed, be obviated in time. He noticed that the modelling class did not seem so attractive and successful as one could desire to see it. That was surprising, for he could conceive of no branch of work which ought to be more attractive; and moreover, there were few branches of their studies which were likely to be of more advantage to them in after life. It was always an advantage to show that one was a practical man as well as an artist, and they might depend upon it that craftsmen and workmen engaged on their buildings would have the more confidence in them if they discovered that the architect was acquainted with particular branches of work, and for this reason he would urge all to take advantage of the modelling class. He heartily concurred in the President's remarks about cramming. His words, slightly paraphrased, would be applicable to the Institute. He, as representing the Institute, might say—"We are entirely opposed to cramming, our object being to test the knowledge of the student, as far as possible, to properly carry out the work entrusted to him in after life, and not merely to pass him in examinations." The aims of the two bodies appeared to be almost identical: the Association endeavoured to impart to students knowledge which would be useful to them; while the Institute tried to test their knowledge in those branches of study, both aiming to achieve what their President had described as fitting men to become in due time decent architects and, he (the speaker) hoped, illustrious architects. The President had referred to the small attendances at their ordinary meetings. He could only offer his sympathies, for the Association was not singular in that difficulty; but with the attractive programme for the coming session, which the President had drawn attention to, he could not help thinking that the meetings for the present session would be much more fully attended.

The President regretted that they had not been able to start workshops in connexion with their scheme was natural, but they must have patience, for Rome was not built in a day, and no doubt in time the workshops would be started. The President had touched upon the question: Is architecture a profession or an art? and had referred to some of his (the speaker's) words on the subject. As those words had been misunderstood and misrepresented, he would venture to quote the exact words which he used, merely remarking that it seemed extraordinary that the ideas expressed in what seemed to him to be such clear language should be misunderstood. The words he had used were:—"The ideal architect is the man in whom these qualities are united—who is an artist, a constructor, and a man of business." He had also used the following words:—"Architecture is not merely an art, it is not merely a science, it is not merely a profession; it is the combination in one of the artist, the constructor, and the man of business, and any who claim that it is one only, to the detriment of the other, detract from the nobility as well as the unique character of their calling." Their President had said that he (the speaker) had properly placed the artist in the foreground, and he might add that he did so emphatically. He said that they had no claim to be called architects in the true and full sense of the word, unless they were artists, able so to dispose of the materials with which they had to deal, as to produce beauty of form and proportion—the highest and noblest work of the architect. He had never replied to criticisms which seemed unfair, but the strongest evidence of the truth of his words was that the gentlemen who were his critics would not be in the distinguished positions as eminent architects which they held to-day if they were not artists, constructors and men of business. The President had referred to the question of "ghosts," and had used words in which all must concur. No architect should allow work to leave his office which was not from his own designs. It might be good work, or it might be bad, but they should be able to say, as Touchstone said of Audrey, "A poor thing, sir (possibly), but mine own." He would not follow the President on the much-debated question of the examinations of the Institute, but he thought two or three words which the President had used were worthy of attention. The President had said that the mere passing of the examinations was not a proof that a man was a thoroughly qualified architect. A supposition that it was had led to much misunderstanding. The result of the examinations was to qualify a man to become an Associate of the Institute. The President had referred, in fair and

critical terms, and in words which met with the approval of his hearers, to some parts of the examinations. He was not a member of the Board of Examination himself, and he might say that he had never regarded the examinations as perfect, and no doubt they could be in some respects perfected. With regard to competitions they were no doubt more worthy of notice now than they were some years ago, and in regard to the appointment of a professional assessor in most competitions he thought some credit was due to the Institute for the part which it had taken in the matter. He should like to emphasise the following words of the President, because they seemed particularly worthy of attention:—"No man should dream of becoming an architect unless he loves the work for its own sake and looks for little reward beyond the pleasure to be derived from doing it to the very utmost of his ability." There was no doubt that unless a man's heart was in his work he would not succeed—a remark which applied to all work, but particularly to art work. Unless an architect's heart was in his work he would not derive the satisfaction and pure pleasure which could be derived from the pursuit of architecture, which was one of the noblest pursuits that man could be engaged in. In conclusion he begged to propose a hearty and cordial vote of thanks to the President for his able and instructive address, and to wish him a prosperous year of office.

Mr. H. D. Searles-Wood, in seconding the vote of thanks, said, that from what he knew of the President—he had known him a great many years—they were extremely fortunate in getting him as their President. He would guide the affairs of the Association so that at the end of his term of office its present prosperous condition would be greatly increased. In reference to the poor attendance at their ordinary meetings, one of their difficulties was to get a discussion upon the papers read, and he might say that many of the papers were of such a character that it was difficult to at once raise a discussion upon them. He thought that if they were to break up a meeting for half-an-hour as soon as a paper had been read, so that the audience could closely examine the exhibits and have an opportunity of asking the author of the paper questions, many of the meetings would be far more successful. With regard to workshops, he thought that a good deal might be done without the intervention of a benefactor. Classes might be organised to visit workshops during working hours, under proper direction, and a good deal of work might be done at the students' homes, and brought up to the meetings to be criticised by competent instructors. This would afford an opportunity for ascertaining whether there was a genuine demand for workshop instruction. There was one other matter to which he should like to refer, and that was to the death of their old friend Mr. L. J. Dessurine, who had represented the *Builder* at their meetings for so many years. Mr. Dessurine was a friend to many of them, and they were much indebted to him for the consideration which he had shown towards the work of the Association.

Mr. Beresford Pite said that as they had such a distinguished competition-winner occupying the chair, he would humbly suggest that he (their President) should start a competition class. He agreed with Mr. Searles-Wood in his expressions concerning the death of Mr. Dessurine.

Mr. J. M. Brydon, in supporting the vote of thanks to the President, said it was always a pleasure to him to attend their meetings, and he had listened with much interest to their President's address. A great deal that the President had said everyone of them would agree with, for his remarks contained much that young men should lay deeply to heart upon entering the profession. With regard to competitions, whether they were good or bad for architecture they were a fact, and if a young man had an ambition to become a distinguished architect, to carry out large public buildings, and leave some monumental work behind him, there was no other way for him in the present day than to fight for them in competitions.

Mr. S. Beale said he thought that the very great debt of gratitude which they owed to the late Mr. Dessurine should be expressed in some manner. He felt very certain that the Association was under a great deal of obligation to Mr. Dessurine for the manner in which reports of their meetings had been given in the *Builder*. Mr. Dessurine had the gift of understanding all the technical intricacies of their discussions, and was able to report their meetings with great intelligence. He, therefore, moved that the Secretaries be instructed to send a letter of condolence to the widow of the deceased gentleman.

The vote of thanks to the President having been put to the meeting and agreed to unanimously.

The President, in reply, said he thanked them very heartily for the manner in which they had passed the vote of thanks. It was twenty-one years since he was articulated, and twenty-one years in an architect's career represented a great amount of work if a man meant to do much in life. He mentioned this so that he might advise young men not to work too hard. A great many had not the inclination, but those who had could very easily work too hard, and he wanted them to understand that it was possible to exert themselves too much at the beginning. With reference to the death of Mr. Dessurrie, he might say that the Committee had decided to write a letter of condolence to the widow. The Association had lost an old friend, and one whom they could very ill afford to lose. With regard to the success of the Association, such success did not depend upon one man or upon the Committee, but upon all their members. They should work together, not only in the classes and the Studio, but in all branches of the work of the Association, and unless they did that they could not hope to be successful; he therefore asked for their co-operation during the present session.

The meeting then terminated.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday at the County Hall, Spring-gardens, Mr. John Hutton, the Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, the following loans were agreed to:—5,550*l.* to the Vestry of St. Martin-in-the-Fields towards defraying the cost of the Green-street improvement; 9,900*l.* to the Vestry of St. Margaret and St. John, Westminster, for the cost of constructing a caretaker's house, stables, workshops, and stores at their depot in Monk-street; and 5,500*l.* to the Commissioners for Public Libraries for St. Saviour's, Southwark, for the purchase of a site and for the erection of a public library.

Photographs of Street Obstructions.—In answer to some remarks by Mr. Lloyd, Mr. Westacott, on behalf of the Highways Committee, said that photographs had been taken of a number of the obstructions which are to be removed under the powers of the London Streets (Removal of Gates) Act, 1893, as a memento of old London.

York-road Sewer, Lambeth.—The report of the Main Drainage Committee contained the following paragraph:—

"We have to report that the work of reconstructing and deepening a portion of the Arnold sewer in York-road, Lambeth, has now been completed, and this work being the first of its kind which has been carried out by the Council without the intervention of a contractor, we think it well to state for the information of the Council the actual cost of the work. The Council will probably remember that in the first instance tenders were invited by advertisement for the execution of the work, but only two were received, amounting to 11,581*l.* 16*s.* 6*d.* and 11,608*l.* 4*s.* 9*d.* respectively. One well-known firm of contractors wrote to say that they were unable to tender for the work under the conditions contained in the first and last two pages of the specification. These referred to the rates of wages to be paid and hours of labour to be observed in the execution of the contract. As the engineer's estimate of the cost of the work amounted to 7,000*l.* only, we could not see our way to recommend the Council to accept either of the tenders received, being as they were about 66 per cent. higher than the estimate. We therefore took up a report to the Council on the 27th of September, recommending that it be referred to us to take the necessary steps for the execution of the work. This recommendation was adopted by the Council, and the engineer now reports as follows as to the completion and cost of the work:—'The total actual cost (as shown below) was 5,303*l.* 3*s.* 9*d.*, less certain credit for plant and materials 140*l.*, showing a net cost of 5,163*l.* 3*s.* 9*d.* It will be noticed that in this case I have charged no part of the office establishment against the work, as, under any circumstances, an expenditure of about 5*l.* a week would have to be incurred on account of the Clerk of Works and Concrete Inspector's wages had it been done by a contractor. Passing on to compare these figures with those of the contractor's tender and the engineer's estimate, they show the following result:—The lowest tender (received from Mr. Thomas Adams) amounted to 11,581*l.* 16*s.* 6*d.*, but from this gross sum must be deducted 1,987*l.* 4*s.* 6*d.* on account of provision money for extras 600*l.*, and 1,347*l.* 4*s.* 6*d.* for various items included in the contractor's tender, but not actually executed. These principally consist

of ventilating pipes, branch brick and pipe sewers, house drains, gullies, cast-iron pipes, and wood paving. All these items have been worked out at the contractor's prices, and this shows a difference of 4,477*l.* 8*s.* 3*d.* below the lowest tender received. The engineer's total estimate was 7,000*l.*, from which has to be deducted a sum of 1,608*l.* 10*s.* 4*d.* made up of the 600*l.* provision money for extras not spent, and the various items of ventilating pipes, branch brick and pipe sewers, house drains, gullies, cast-iron pipes, and wood paving, as in the case of the contractor's tender, but in this case worked out at the prices in the engineer's estimate. This result shows that the work has been executed for 228*l.* 5*s.* 11*d.* below the engineer's estimate. The time originally fixed in the specification for the completion of the work was six months. The actual period of construction is spread over seven months, and when there is taken into account the delays inevitable in starting a new work of this kind without the aid of a contractor, the approximation is fairly satisfactory, and it is doubtful, looking at our past experience in contract work, whether it could have been brought to a conclusion in a shorter period than that actually occupied. I am glad to report that the quality of materials and workmanship was fair and as good as I should have anticipated had the work been done by a contractor. The following is a statement of the cost of executing the work, compared with the lowest tender received:—

	£	s.	d.
Amount of lower tender.....	11,581	16	6
Deductions for work not executed and provision money	1,948	4	6
Amount of tender for work executed	9,640	12	0
Actual cost of the work—			
Wages and pumping.....	£3,026	6	3
Materials	2,157	7	6
Rent	119	10	0
	5,303	3	9
Less credit for unused plant	140	0	0
	5,163	3	9

Net saving to the Council by having work done without a contractor 4,477*l.* 8*s.* 3*d.*

Mr. Emden moved that the report be not received. The conditions under which tenders were invited were such that the estimates were increased by the contractors in view of the resolutions of the Council on the wages question. Besides, the engineers estimate was 7,000*l.*, and the saving after deducting the omission was only about 200*l.* The fact that the work had been done for less than the engineer's estimate clearly showed that the contract price was an exorbitant one. Under these circumstances they had no right to say that they had saved over 4,000*l.*

Mr. Reed seconded.

Mr. Beachcroft considered that the Committee were fully entitled to the credit for saving the ratepayers' money; but the Council must not think, because of this success, that they could dispense altogether with the contractor.

Mr. John Burns, M.P., after testifying to the excellent work done by the Committee, made a charge against Mr. Emden, who, he said, had gone to York-road and put leading questions to shopkeepers against whose property the sewer passed. The sum of 4,477*l.* 8*s.* 3*d.* did not include the prospective bogus claims that were sent in at the instigation of a member of the Main Drainage Committee—of Mr. Emden.

Mr. Emden said that Mr. Burns's statement was absolutely incorrect. What occurred was as follows:—He had complaints made to him by occupiers in York-road of the time taken in the construction of the sewer, and he took an opportunity of ascertaining whether there was delay and whether or not people were being inconvenienced. Two persons asked him whether they had any claim for compensation against the Council, and he told them they had no claim whatever and had no *locus standi*. He maintained that he was perfectly justified at any time in making inquiry into the truth of statements that people were injured by the action of the Council.

Mr. J. Williams Benn, M.P., asked the Chairman whether he had any knowledge of the matter.

The Chairman said that when certain facts came to his knowledge he communicated them to the main Drainage Committee in the presence of Mr. Emden. As to Mr. Burns's statements, he endorsed every word he had said.

The amendment having been put and lost, Colonel Hughes moved that the allegations which had been made should be inquired into, and that the matter be referred to the General Purposes Committee.

Mr. Lemon seconded.

Mr. Emden said he would decline to submit

the question to a committee opposed to him; nor would he leave the matter to the Chairman. He thought his proper course would be to take legal advice, and under those circumstances the matter would not rest where it was.

Mr. Beachcroft thereupon moved that the Council proceed to the next business. This was agreed to.

Millbank Prison Site.—Included in the report of the Public Health and Housing Committee was a recommendation that the Council should acquire about ten acres of the rear portion of the Millbank Prison site at the sum of 2,500*l.* per acre, for the purpose of erecting thereon artisans' dwellings on certain conditions. As the recommendations have involved an expenditure on capital account of more than 5,000*l.*, its consideration required to be adjourned for a week.

Blackwall Tunnel—Yabsley-street Artisans' Site.—The report of the Bridges Committee, recommending that the work in Yabsley-street, Poplar, be carried out at an estimated cost of 1,110*l.* without the intervention of a contractor, was agreed to.

The Council adjourned at 7 o'clock.

In reference to the Report on the Parker-street Lodging Houses, quoted in our report of the County Council proceedings last week, Messrs. Holloway Bros. send us a copy of a letter which they have addressed to the Council, complaining that they have been seriously misrepresented in that report in regard to the statement that there had been no saving effected by substituting ordinary concrete for Messrs. Homan & Rodger's flooring (see report of County Council proceedings, page 285 *ante*). In the latter part of their letter, Messrs. Holloway say:—

"The only question put to us with regard to a saving on fireproof floors was, whether a saving could be effected by using ordinary concrete in lieu of Messrs. Homan & Rodger's patent brick floor. We expressed an opinion that there would be a saving, and quoted a price per yard (superficial) for the former. The architects calculated the total sum from this quotation. In the adjustment of the accounts your surveyors accepted the price quoted as the basis of their calculations.

We find upon inquiry your Committee have had no communication with the surveyors in the matter. Consequently for our own satisfaction we have ascertained from the surveyors' accounts precisely how the matter stands, and it may perhaps surprise the Committee to learn that the substitution of concrete for Messrs. Homan & Rodger's floor has effected a saving of 75*l.* 6*s.* 4*d.* The extra amount referred to in the report is incurred by additional constructional ironwork and other items (which your surveyor can furnish) which are entirely separate and not in any way consequent upon the alteration made in the floors.

In a communication with the Chairman of the Council, we expressed our willingness to deduct from the account any sum charged therein as an extra, which have been incurred by misrepresentation on our part. We are still prepared to abide by this offer."

COMPETITIONS.

FREE LIBRARY AND TECHNICAL SCHOOLS AT ST. HELENS.—The committee appointed to carry out the erection of the new technical schools and free library at St. Helens have given their awards on the plans for the new buildings submitted by the competing architects. The first premium, of 100*l.*, is given to Messrs. Woodhouse & Willoughby, of Manchester. The schools and library are to cost 20,000*l.*

NEW POLICE STATION, NEWCASTLE-ON-TYNE.—The Newcastle Corporation, having determined to erect a new police station in the Scotswood-road at a cost of about 4,600*l.*, invited designs for the same from local architects only. In reply nine sets of designs were sent in. The Watch Committee referred these to Mr. Charles Barry, F.S.A., to advise them as to the three best designs in order of merit, and he reported as follows:—1st, motto "Cavendo Tutus," Mr. S. Piper, Westgate-road; 2nd, motto "Waverley," Messrs. Marshall & Dick, 13, Grey-street; 3rd, motto "Grip," Messrs. E. F. W. Liddle & F. W. Frazer, 24, Collingwood-street. The Watch Committee have, however, varied this order, placing "Waverley" first and "Cavendo Tutus" second, considering the first-named more suitable to their requirements and less costly than the one placed first by the assessor, and will recommend the Corporation accordingly. By the conditions the architect of the design placed in the first place was to be employed at the usual professional commission, and the sum of 75*l.* was to be divided between

the authors of the designs taking the second and third places.

BATHS AND WASH-HOUSES, NEWCASTLE-ON-TYNE.—The Newcastle Corporation having determined to erect baths and wash-houses in "Gallowgate," at a cost of about 7,000*l.*, invited designs from local architects only, and, in reply, eleven designs were sent in. These were referred to Mr. Charles Barry to advise the special committee as to the three best designs, and he selected the following:—1st, motto "Saturn," Mr. Gibson Kyle, 130, Pilgrim-street; 2nd, motto "Union," Messrs. Marshall & Dick, 13, Grey-street; 3rd, motto "Potestas," Mr. F. W. Purser, 7, Collingwood-street. Subject to confirmation by the Corporation, the Baths and Wash-house Committee have adopted Mr. Barry's report. By the conditions the successful architect was to have the appointment as architect at the usual rate of commission on the cost, and the sum of 75*l.* was to be divided between the authors of the designs placed second and third.

Correspondence.

To the Editor of THE BUILDER.

THE MANX CROSSES.

SIR,—Mr. Archibald Knox thinks that due consideration has not been given to what he has written on this subject, but as he did not state distinctly whether he imagined the crosses to be of Christian origin or not, it was to this point only that I desired to direct attention. As the use of the symbol of the cross is not confined to any particular period, race, or religion, the following extract from Taylor's "Words and Places" may be of interest as supporting the statement made by Mr. J. Romilly Allen that "amongst the crosses in the Isle of Man are three distinct types, each of which is the product of a different archaeological area," as well as tending to show that heathenism survived there to a late period:—

"The ethnology of the Isle of Man may be very completely illustrated by means of local names. The map of the island contains about 400 names, of which about 50 per cent. are English (Anglo-Saxon), 21 per cent. are Norwegian, and 50 per cent. are Celtic. These Celtic names are all of the most characteristic Ery type." . . . "It is interesting to observe that the names which denote places of Christian worship are all Norwegian; they are an indication of the late date at which heathenism must have prevailed, and help to explain the fact that so many heathen superstitions and legends still linger in the island." P. 165, ed. 1888.

One subject, that "of a man stabbing a serpent with a sword," might, as the serpent and dragon are both types of the Evil One, be thought to refer to St. George or St. Michael, and the dragon, were it not for the fact that the same idea is found in a widely-spread pre-Christian mythology, although all, perhaps, may ultimately be connected with the narrative in Genesis iii. Apollo is represented as slaying the serpent Python, and Hercules as strangling serpents while yet in his cradle. An Egyptian goddess pierces the head of a snake with a spear, the malignant serpent Calyia is slain by Vishnu, and Thor is said to have bruised the head of the great serpent with his mace, while in Mexico the serpent is crushed by the great spirit Teotl.

It, therefore, seems to be necessary with regard to the cross and its ornament to distinguish between their pre-Christian and Christian origin, use, and meaning.

Does not the inscription referred to as being upon a cross at Kirk Michael indicate that Bridson raised it for his own soul and for the soul of his faithful friend Gaut (who made it), and for the souls of all in Man, rather than that Gaut claimed to have made all the crosses in Man?

J. HOUGHTON SPENCER.

Taunton, Oct. 16, 1893.

WEST HARTLEPOOL TECHNICAL SCHOOL AND LECTURE HALL COMPETITION.

SIR,—Can any of your readers kindly inform me where I can find a technical school that cost about 3*d.* a cube foot?—for that is about the rate which the above authorities allowed for a technical school "to comply with the requirements of the South Kensington (Science and Art) Department, the Durham County Council, and the building regulations of this Corporation."

This Corporation fixes the area, or accommodation, of nearly every room; and in the latter cases the area per head for each class of laboratory, workshop, &c., is—thanks to the many published plans—well known to the profession, and it works out to about 20,000 sup. feet of floor, or "carpet area," without hall, corridors, and staircases. The "Department" fixes the minimum height of nearly every room; and the cubical contents of the rooms alone works out to about 200,000 cubic feet, or, with the hall, corridors, staircases, foundations, walls, roofs, &c., the cubical contents of the building are about 450,000 cubic ft.; and as it is to cost 5,000*l.*—

including lighting, warming, and architect's commission—it comes to about 2*d.* a cube foot.

My experience is that such buildings cost about 3*d.* a cube foot, so that this institution will cost about 15,000*l.* instead of 5,000*l.*; but by clause 16 the author of the selected design is not to receive the premium unless the Corporation receive a tender from an approved contractor to execute the work for 5,000*l.* The lecture-hall is to seat 1,500 persons, besides platform, orchestra, &c., and to have "all necessary ante-rooms, offices, and lavatories" for 4,000*l.* Perhaps one of your readers will also kindly inform me where I can find a model lecture-hall for such an outlay. I should say 6,000*l.* would be nearer the mark.

I have been in practice upwards of forty years, and have met with a great many unreasonable requirements, but never one anything like the above.

AN INTENDING COMPETITOR.

The Student's Column.

GEOLOGY XVII.

THE ORIGIN OF SCENERY (CONTINUED).

THE sea is another very active agent of denudation. It does its work both chemically and mechanically. The chemical aspect of the subject has not been carefully studied, but we know from the decay of stone in piers and breakwaters, for instance, as well as from the decomposition of iron when brought within reach of the sea, that the latter possesses considerable solvent power. Its mechanical action, however, has formed the subject of many investigations, and is well understood. Sir Archibald Geikie states that the mechanical work of erosion by the sea is done in four ways:—(1) the enormous force of the breakers, which suffices to tear off fragments of solid rock; (2) the alternate compression and expansion of air in crevices of rocks exposed to heavy breakers, which dislocates large masses of stone, even above the direct reach of the waves; (3) the hydraulic pressure of those portions of large waves that enter fissures and passages, tending to force asunder masses of rock; and (4) the waves make use of loose detritus within their reach to break down cliffs. Probably, by far the largest

break down the cliff and the material falling on the shore is removed by the sea. In such cases, the cliffs generally lie at a rather low angle, though not always, and are rugged in appearance. On the other hand, hard rocks frequently resist atmospheric denudation so strenuously that the sea eats away or hollows out the base of cliffs, causing the rocks above to overhang. From this the student will perceive that the amount of work the waves are able to perform largely depends on the nature of the cliff: a soft incoherent deposit is more easily removed than a hard one, and when the cliffs are composed of hard and soft bands of stone alternating with each other, some fine effects are often produced. The long ledges of rock running out to sea on so many parts of our coast are merely the remnants of strata that extended at least as far as the furthestmost extremities of those ledges, the less durable beds having perished. We may remark that marine artists are not always sufficiently careful in depicting these ledges, which are often drawn at an impossible dip with reference to their strike, by reason of the jointing not being properly interpreted. The pinnacles of igneous rocks standing out of the water are frequently portrayed as though they were sandstones; whilst the weathering of the latter along shore is often represented so indifferently, even in pictures of some note, as to suggest that the artist had never properly studied them on the spot, but filled them in from his imagination in the studio on his return home. It must not be forgotten that the large pieces of loose rock on the foreshore are often not *in situ*, and are sometimes of widely differing varieties of material; yet how frequently are they depicted with their jointing all in the same direction and with impossible shapes?

We have dwelt somewhat on the subject of marine erosion, not only from its interest in giving rise to cliff scenery, but because its effects are so often found some distance from the sea, where the rise of the land, in recent geological times, has caused the waters to retreat, and the cliffs were thus left a long way inland. These, however, must not be confounded with what are called escarpments, the differences between which are illustrated in fig. 1, and may be defined as follows:—

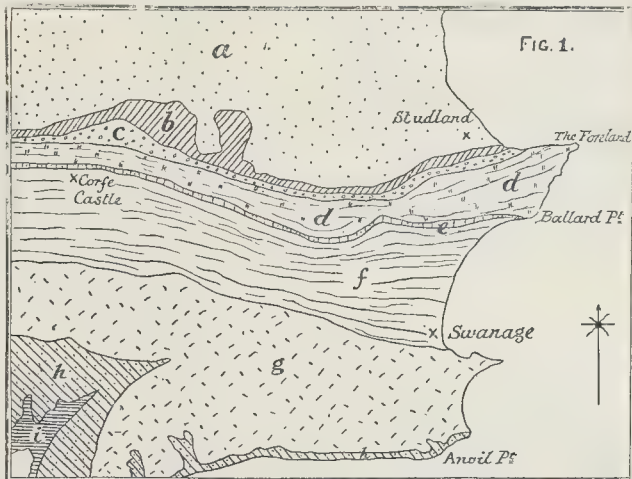


Fig. 1.—Geological Map of part of the Isle of Purbeck, showing the relation between Cliffs and Escarpments.

a. Lower Bagshot Beds. b. London Clay. c. Reading Beds. d. Chalk. e. Upper Greensand. f. Weald Clay and Hastings Sand. g. Purbeck Beds. h. Portland Stone. i. Kimridge Clay.

Amount of erosion is accomplished in the last-mentioned manner. The waste of many sea-cliffs, however, is largely due to atmospheric agencies, as described in the last article. These

FIG. 2.



Fig. 2.—Section across Fig. 1 from Studland to Anvil Point. x x = faults.

A Cliff is a natural section of rock, formed by the combined action of atmospheric denudation and marine erosion; it may cut across the outcrop at any angle. This is exemplified in

fig. 1 and its accompanying section fig. 2, where the Chalk, Upper Greensand, and Wealden Beds form a fine continuous cliff from Studland to near Swanage; as also do the Purbeck and Portland beds between Swanage and Anvil Point.

An *Escarpment*, on the other hand, although often resembling a cliff to some extent in that it is more or less precipitous, has no connexion with marine erosion, and is governed solely by the action of atmospheric denudation and the distribution of geological formations concerned. In fig. 1 an elevated ridge, in some parts of its course 650 ft. in height, runs from the Foreland to Corfe Castle and beyond, which ridge, as the reader will see, is coincident with the outcrop of the Chalk (*d*) in the area. This would be called a chalk escarpment, and has remained elevated above surrounding rocks by reason of its having resisted the action of denudation whilst the softer Tertiary beds (Bagshot, London Clay, and Reading Series) to the North and the incoherent Wealden deposits to the South of it have been worn away, as shown in the section fig. 2. Let us suppose for a moment that the Chalk in the district, instead of being highly inclined, was horizontally disposed, and that the area to the North of the outcrop shown was an elevated plateau-like tract of country bared of the Tertiary formations, but presenting a precipitous edge to the South along the line from Ballard Point to Corfe Castle. This edge would equally well be an escarpment; it is not absolutely necessary that the latter should be ridge-shaped, though it is very often so. The North and South Downs are escarpments of the Chalk, whilst the various harder members of the Jurassic also provide us with excellent examples in Gloucestershire, Northamptonshire, &c.

Very picturesque bits of scenery are often produced by *landslips*, both near the sea and inland. A landslip may be described as a subsidence or slipping of a large portion of land from a high to a lower level, and may be brought about (1) by earthquakes; (2) by the solution of rocks underground and the formation of immense caverns or galleries; or (3) by the mechanical or chemical action of percolating water. Of these it may at once be stated that earthquakes are not responsible for many landslips in this country—certainly none of note—the daily press to the contrary notwithstanding. The subsidence of land in Cheshire and elsewhere is due to the second cause referred to, and has been brought about by the abstraction of salt from beds beneath the surface, both by natural and artificial agencies. This phase, however, does not particularly interest us at the moment, though in another article we hope to show its effects on the stability of buildings on certain sites, where it assumes enormous importance.

Ordinary landslips have been produced by the third cause mentioned, namely, the action of percolating water, both mechanically and chemically. The following section (fig. 3), from a sketch by the late Sir Henry de la Beche, sufficiently illustrates a case of this nature. Here it will be

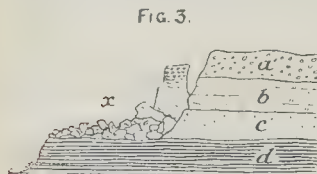


Fig. 3.—Section of Landslip, Lyme Regis.
a. Drift gravel. b. Chalk. c. Greensand.
d. Lias clay. x. The landslip or undercliff.

seen that the impervious Lias clay is overlain by a porous deposit, Greensand, above which comes the Chalk, capped by drift gravel. Rain percolates through the upper strata, and being arrested in its downward progress by the impervious bed *d*, is thrown out as springs along the line of junction between the two formations *c* and *d*. In issuing, the spring-water naturally carries off a certain amount of *c* in chemical solution, as well as particles of sand in mechanical suspension. Thus the beds *a* and *b* lose their support and fall in confused masses forming *x*, an undercliff. Such landslips frequently extend laterally for several miles, with a varying breadth up to half-a-mile or more.

The well-known Undercliff at Ventnor in the Isle of Wight was formed in a precisely similar manner; owing to the impermeability of the Gault clay the surface waters flow out between it and the Upper Greensand, removing part of the substance of the latter in such a way that immense

portions of the overlying Chalk, losing their support, have fallen, and produced the rugged scenery of the Undercliff. The Sandgate landslip, fresh in everyone's mind, is another case in point, and was described and illustrated in the *Builder*, Vol. lxiv. (1893), p. 185.

OBITUARY.

MR. C. B. BIRCH, A.R.A.—On the 16th inst. the death occurred of Mr. Charles Bell Birch, A.R.A., who was sixty-one years of age at the time of his death. He began his artistic studies at the Somerset House School of Design at the age of twelve, and in 1845 he became a student of the Berlin Royal Academy, where he continued his studies until his return to England in 1847. On his return to England, Mr. Birch passed through the schools of the Royal Academy, gaining two medals, and, after some further years spent in study, entered the studio of the late Mr. J. H. Foley, R.A. In 1864 the Art Union of London having offered a premium of 600*l.* for the best original figure or group, a prize open to all nations, Mr. Birch was the successful competitor with his group "A Wood Nymph." He subsequently exhibited many works at the Royal Academy, among which were a bust of Lord John Russell, in marble, for the City Liberal Club; a colossal statue of Mr. S. T. Chadwick, M.D., executed in bronze for the town of Bolton; and an ideal work of "Retaliation," subsequently cast in bronze and purchased by the Commissioners of the Sydney Art Gallery. In 1879 Mr. Birch exhibited "The Last Call," a group of heroic size, representing a trumpeter of Hussars and his horse shot down simultaneously while in the act of charging. He executed in 1880 the dragon on the Temple Bar memorial, and in 1883 an equestrian statuette of William III., in silver, for the King of the Netherlands. In 1887 he produced two colossal allegorical figures, marble, representing Justice and Plenty, which decorate the entrance of the Australian Joint Stock Bank, Sydney; in 1888 a colossal marble statue of the late Earl of Dudley; a life-size marble statue of the late Earl of Beaconsfield; a memorial to Jenny Lind; "A Water Nymph," a statue in bronze, life-size (which we illustrated in the *Builder* for July 27, 1889). We also illustrated Mr. Birch's group "Godiva" in the *Builder* for May 10, 1884; and in 1889 he executed a colossal marble statue of the Queen. He executed in 1880 a series of twenty original designs for the Art Union of London in illustration of Lord Byron's poem "Lara." He was elected an Associate of the Royal Academy in 1880.

GENERAL BUILDING NEWS.

ELECTRIC LIGHT STATION, HAMSTEAD.—The contract for the new Electric Light Station for the Vestry of St. John, Hampstead, to be erected in Lithos-road, Finchley-road, has been let to Messrs. Verbury & Sons, builders, of Kilburn, their estimate being 7,300*l.* Mr. Arthur Ardron, F.R.I.B.A., of 39, Victoria-street, Westminster, is the architect for the buildings.

NEW OFFICES, "NORTH-EASTERN DAILY GAZETTE," MIDDLESBROUGH.—New offices for the *North-Eastern Daily Gazette*, Middlesbrough, have just been erected by Mr. Thos. Dickinson, contractor, Middlesbrough, from plans and designs by Mr. R. Lofthouse, one architect, Middlesbrough. The building, which is Renaissance in style, is constructed of a stone procured near Barnard Castle. The carving of the capitals of the pillars between each window has been executed by Mr. Arrowsmith, of London. The principal entrance is at the west side of the building, from Zetland-road, through a hall having a polished oak screen, and doors glazed with tinted quarry glass, with four figured panels illustrative of the early history of printing. The entrance-hall is laid with ornamental encaustic tiles. The principal elevation is entirely faced with Dun-house stone, and is 6 ft. high to the top of the parapet, and 80 ft. to the top of the ball on the centre gable. The premises have a frontage of 40 ft. to Zetland-road and Brunswick-street, and a depth of 66 ft. The building is five stories in height, and, in addition, there is a basement below the ground level. The foundations are made of Portland cement concrete. The walls are built of hard local bricks, set in Portland cement. The gas-engines and shafting are located in the basement, the shafting being placed in brick trenches below the floor. The printing machines are placed on solid foundations, so as to avoid vibration. A top light is secured to the machine-room by forming an area above the first floor 10 ft. long by 5 ft. deep, and this area is carried up to the top of the building, securing an east light to each floor. The whole of the first floor is devoted to the commercial offices. All the fittings, which were executed by Messrs. Lithgow & Storry, Middlesbrough, are in polished Spanish mahogany, with bevelled cut plate glass in the screens. On the second floor are private offices for the editor, sub-editors, and reporters, fitted with separate copy-boards and speaking tubes, electric bells, &c., communicating with the composing-room, to which the whole of the third floor is devoted, and in which over forty men are employed. Special provision has been made

to give the compositors plenty of air space and light. The whole of the buildings are heated with low-pressure hot-water pipes by Messrs. Musgrave & Co., of Belfast, ornamental radiators being placed in all the principal rooms. Ventilation to all floors is secured by means of Tobin's inlet brackets and tubes, and Ching's improved mica flap outlet ventilators, communicating with flues provided for this purpose; whilst the stereotyping-room is provided with three of Boyle's improved air-pump ventilators placed on the roof. A stone staircase, fitted with cast-iron balusters and polished oak handrail, connects the various floors, and a circular iron staircase, in addition, connects the rear portion of the first and second floors. All the floors are fireproof, and have been laid by Messrs. Homan & Rodgers, of Manchester. The first, second, and third floors are laid with wood blocks on the concrete. The ground and fourth floors are finished with one inch of metallic lava asphalt, and the cellar floors and landings are executed with Homan & Rodgers' quartz finish cement. The walls of the machine-room are faced with white glazed bricks, and all the other walls and ceilings are plastered with adamant. Messrs. Dorman, Long & Co.'s steel joists have been used for lintels and other purposes. The cellars are lighted by vertical lens lights and semi-prism pavement lights, the area and slope below being faced with white glazed bricks. Mr. Luscombe has acted as clerk of works.

PUBLIC CONVENIENCES IN SOUTH LONDON.—The St. George's Vestry, Southwark, have at last completed the construction of the underground convenience in the St. George's-road, opposite the "Elephant and Castle." The necessary plans, specifications, and estimate of cost have been prepared by Mr. Hiscocks, C.E., the Engineer to the Vestry; and the contract having been submitted to public competition, the tender of Mr. George Jennings, of Lambeth Palace-road, was accepted for the performance of the work, which was commenced on May 8 last. The structure, which is provided with separate stairways for entrance and exit, protected by ornamental iron railings, has been finished in white glazed bricks, supplied by the Farley Iron Co., and has every modern improvement not only in connection with the sanitary appliances and plumbing work, but also as regards drainage, and a very complete scheme of ventilation by means of the Blackman Exhaust Ventilator, discharging into the ventilating lamp column, designed and executed by Mr. G. W. Cannon, of London-road. The accommodation comprises a range of twenty urinals and ten w.c.'s, the linings and divisions of which are of polished marble. A lavatory top of similar material is fitted with two basins, and the doors, framing, and joiner's work throughout are of polished pitch-pine, the doors to w.c.'s being provided with Maskelyne's Patent Coin Receiving Locks. The work has been carried out within both the stipulated time and the amount estimated by the Engineer; and it is estimated that the charge of one penny for use of w.c.'s and twopence for lavatory will represent a considerable surplus after all expenses are paid, and thus, it is hoped, will enable and encourage the Vestry to undertake similar works in other parts of the parish, where they are much needed.

NEW CHURCH, WORCESTER.—On the 11th inst. the foundation-stone of St. George's New Church, Worcester, was laid by Earl Beauchamp. The new church will be in the Perpendicular style, and will be built of red brick, with Bath stone and Portland stone dressings. It will consist of nave, nave aisles, north and south transepts, chancel and chancel aisles, two vestries (for clergy and choir), with a large heating chamber beneath, and, when completed, two turrets on the west front, facing St. George's-square. The dimensions of the building will be 59 ft. 10 in. across the nave and aisles, by 116 ft. 5 in. from east to west. The height from the floor to the top of the walls will be 31 ft., and 51 ft. to the ridge. The roof will be open timbered except in the chancel, where there will be a panel ceiling. The porches, nave, and aisle passages will be paved with red tiles, and the choir and sanctuary with marble Mosaic, and the space beneath the seating and the vestries laid of deal blocks. There will be a roof of Westmoreland green slate. The seating accommodation is to be for 724. There will be screens between the chancel and chancel aisles. The new church will be upon the site of the former building, with additional ground required by the enlargement. Mr. Aston Webb, of Westminster, is the architect, Mr. Thomas Collins, of Tewkesbury, the builder, and Mr. W. Birch, of Worcester, is superintending the work.

NEW ROOFS, ST. GERMAN'S CHURCH, CORNWALL.—The Church of St. Germans has just received a new roof, which has been designed by Messrs. J. P. St. Aubyn & Wadling, of London; and the contractors for the work were Messrs. Lang & Sons, of Liskeard. The carved work has been carried out by Messrs. Harry Hems & Sons, of Exeter.

PRIMITIVE METHODIST CHAPEL, BURNLEY.—The memorial-stone of a Primitive Methodist school-chapel to be erected in Bricliffe-road, Burnley, was laid on the 7th inst. The building will comprise a central-hall, a gallery and nine class-rooms, having accommodation for 400 scholars or 750 worshippers. The work is being

FOREIGN AND COLONIAL.

carried out from designs and under the supervision of Geo. E. Bolshaw, architect, of Southport and Crewe, at a cost under 3,000l.

CHURCH, HORRURY JUNCTION, YORKSHIRE.—On the 10th inst. the new church at Horrury Junction, dedicated to St. Mary the Virgin, was consecrated by the Bishop of Wakefield. The edifice has cost about 8,000l., and is in the fourteenth century style. It provides sitting accommodation for about 300 persons. Messrs. Bodley & Garner, of Gray's-inn-road, London, were the architects, and the contractor was Mr. H. R. Franklin, of Deddington, Oxon.

PROPOSED CATHOLIC CHURCH, HARROW-ON-THE-HILL.—A correspondent informs us that it is in contemplation to erect a new Roman Catholic Church at Harrow-on-the-Hill, and that it is meant to some extent to serve as a memorial of Cardinal Manning, who, as many of our readers will doubtless remember, was some seventy years ago a Harrow boy. In the meantime a group of the Crucifixion, which belonged to a priest now deceased, and which has hitherto lain hidden away in a dark corner among a heap of domestic rubbish, has lately been taken up on a road laid across the chancel of the existing temporary iron church.

SANITARY AND ENGINEERING NEWS.

ELECTRICITY WORKS, BLACKPOOL.—The Blackpool Electricity Works which have just been erected by the Corporation, were opened on the 13th inst. Those invited to attend the ceremony assembled at the works in the afternoon, where the Mayor and Mr. Councillor Pearson, the Chairman of the Board of Electricity, and the Chairman of the Harrow and Light and Tramways Committee, received Lord Kelvin, who, after an address, gave the signal for all the engines to be started simultaneously. The company then proceeded to the Marine Promenade, where Lord Kelvin switched on the arc lamps, which extend its whole length. A little later a banquet, to which about 200 guests sat down, was given at the Clifton Arms Hotel. The Mayor and Mr. Councillor Pearson, and amongst others called upon to speak during the evening were Lord Kelvin, the Mayor, the Mayors of Preston, Newport, and Grimsby, Councillors Pearson, Heap, Fish, and Hacking, Aldermen Cocker, Bickerstaffe, and Miles, Dr. McNaughtan, and Messrs. Robert Hammond, R. H. Fowler, T. Brockie, T. Parker, V. P. J. Fawcett, and H. E. Harrison. Everything went off very smoothly, except the illumination of the Blackpool Eiffel Tower. For this purpose, incandescent lamps were connected twenty in series and lit direct from a high-tension alternator, but as they were only temporarily installed and were for hours exposed to a heavy rain, driven by a strong wind, it was surprising, not that the outlining of the tower failed to be a complete success, but that the lights lit up at all under such adverse conditions. The engine and dynamo-house at the works is 28 ft. long by 58 ft. wide, and is lined with white enamelled bricks. There are six horizontal compound engines, by Messrs. Fowler & Co., of Leeds, one of 200, two of 100, and three of 60 indicated horse-power. The three smallest engines drive Brush dynamos for the 101 Brockie Pell arc lamps, and the largest a Lowrie-Larke low-voltage alternator, while the other two drive Hall's alternators, manufactured by Messrs. Fowler & Co. There are three Lancashire boilers, by Galloway, fitted with mechanical stokers. Messrs. Hammond & Co. were the contractors, and the transformers and plant not specially mentioned are of the types supplied by this firm.

WATER SUPPLY, KINGSBURY, WARWICKSHIRE.—On the 13th inst. Mr. Riezi Walton, C.E., Local Government Board Inspector, held a public inquiry at Kingsbury. Board School in connexion with the application of the Tamworth Rural Sanitary Authority for permission to borrow 5,000l. for the purpose of providing a water supply for the parish of Kingsbury. The scheme was opposed by several local residents. Mr. H. J. Claron (Surveyor to the authority) explained the proposed scheme, stating that the well and reservoir would be at Hurley, the highest part of the district. A 6-in. bore-hole had been made, and water met with at a depth of 15 ft., which a fortnight's continuous pumping led to exhaust. The distributing mains would be 1½ miles in length. The reservoir would be 2½ miles away from the well. The total cost of the works would be 5,000l.

PROPOSED STREET IMPROVEMENTS, CARDIFF.—At the monthly meeting of the Cardiff Rural Sanitary Authority on the 11th inst. it was resolved to allow 2,000l. for private street improvements, and the Surveyor, Mr. W. Fraser, A.M. Inst. C.E., and the Engineer, Mr. J. H. Jones, were authorised to prepare plans, estimates, and specifications for this purpose. It was also resolved to close the street ventilators at Llandaff and Maindy, and erect two gas ventilating pipes similar to those designed and erected by Mr. Fraser, at the City of Llandaff, at a cost of about 30l. each. At the same meeting it was also resolved to borrow 200l. for extension of the Dinas Powys Waterworks, and the Surveyor was also instructed to prepare plans and estimates for the application of the "Aluminaferrous process" to the sewage of Dinas Powis as a temporary arrangement until a proper sewage scheme was prepared by their Surveyor.

FRANCE.—Among the new promotions in the legion of honour, made on the proposal of the Minister of Public Works, we may mention that M. Humbolt, Inspecteur-Général des Ponts et Chaussées, who directed the work of bringing the water of the Avre to Paris, has been promoted to the rank of "officier"; while M. Camut, "Architecte-en-Chief des Bâtimens Civils," and M. Cassien Bernard, "Architecte des Bâtimens Civils," have been created "chevaliers."—The organisation of the general services for the Paris Exhibition of 1900 has now been definitely fixed as follows: M. Delaunay-Beleville, President of the Chamber of Commerce of Paris, is appointed "Directeur-Général de l'Exploitation"; M. Derville, President of the Tribunal of Commerce of the Seine, is appointed Assistant-Directeur-Général. M. Grison is "Directeur des Finances"; M. Huet, Directeur des Travaux de Paris, will fill the post of "Directeur des Services" of the roads, parks and gardens, ornamental water, drainage, and lighting. M. Bouvard, Inspecteur-général d'Architecture, is appointed "Directeur des Services d'Architecture"; and the chiefs of the various services of the Municipal Works Department will be attached to the Exhibition for all work within their several administrative departments.—The museums of the Louvre and Versailles have just received a number of drawings by the celebrated painter David, which have been left by his great-nephew; among them are drawings of "Le Serment du Jeu de Paume," the "Distribution des Aigles," the "Mort de Marat," the portrait of the Empress Josephine, &c.—MM. Peynot and Carlier have been commissioned by the Government to execute statues of Turenne and Condé intended as decorations for the grand staircase of the Ecole de Guerre at Paris.—In the foundations of the old Sorbonne building, at present under demolition piece by piece, there has been discovered a copper plaque covered with lead which was placed in the ground in 1697, to commemorate the rebuilding of the ancient monument.—The Minister of Public Instruction has just officially inaugurated the Exhibition of Mahomedan Art at the Palais de l'Industrie, which has been organised with much care by M. Bénédite, Curator of the Luxembourg Museum. Besides rich Oriental textiles and rare furniture and mosaics, there is a fine collection of pictures by Théodore Chassériau, Delacroix, Fromentin, Berchère, and Regnault.—Some details as to the restoration at Versailles and the Trianon, under the direction of M. Marcel Lambert (architect), may be here given. MM. Tony Noël and Thabard are commissioned to restore the statues on the façade of the palace towards the Cour du Marbre: MM. Martin, Guillot, Pilet, Pézieux, Houssin, Floch, and Lefranc are repairing the statues on the façades towards the park; some busts have been entrusted to MM. Sobry, Lefranc, Tournais, and Power. At the Trianon M. Lambert is assisted by M. Guillaux at the Pavillon Français and "Trianon Sous Bois"; and by MM. Guillaux, Pézieux, Demaille, and Caniez, at the Pavillon de Musique and its surroundings. M. Marqueste undertakes the work on the "Pot Bouillant" and "Bassins des Couronnes"; and the Sirens; M. Pagel that on the basin called "Du Filon"; M. Bocquet, and M. Bouchery have been commissioned to take in hand all the carved ornament.—The Committee of "Amis des Monuments Parisiens" has addressed to the Government an energetic protest against the proposal to establish a railway station on the Esplanade des Invalides.

BRUSSELS.—A competition has been opened for the design of a memorial monument to the French soldiers who were killed during the siege of Antwerp in 1832. The committee in charge of the erection of the monument to be in the form of a mausoleum.—The Belgian Salon will be closed at the end of the month. The unsightly provisional buildings in which the collections are housed are, however, not to be taken down for some time, as a Food Exhibition is to be held in them during December. This exhibition is under the patronage of the Minister of Agriculture.—Some important improvements are to be carried out at the Eglise de la Chapelle. New stained glass windows will be put in, and the spacious organ-loft altered for the reception of a new organ. The necessary expenditure will be carried jointly by the Belgian Government and the Municipal authorities.

TRAVES.—There are to be some improvements to the surroundings of the historical Roman "Porta Nigra." The Municipality intends buying up some plots in proximity to the ruins and turning them into pleasure-grounds.

MISCELLANEOUS.

THE FOOTWAYS, WESTMINSTER BRIDGE.—The footways of Westminster Bridge are being repaved by the County Council with the Limer asphalt paving, which has many years ago been twice laid on these important footways for the Office of Works. **PROPOSED HOSPITALS EXHIBITION.**—It has been announced that active steps are now in progress for holding an exhibition in the West-end next year—the West-end seems to have a monopoly of such

favours—the proceeds of which are to be devoted to the London hospitals. It is even said that an excellent site has been procured. The exhibition is to be divided into three sections—a professional section, a loan collection, and a trade section. The first section is to be reserved for exhibitors professionally connected with or interested in ambulance work, calisthenics, dentistry, hygiene, medicine, nursing, philanthropy and surgery. There will also be a naval and military section. The loan collection is expected to illustrate the history, organisation and development of London hospitals, as well as to contain drawings, pictures, photographs, relics, &c. The trade section will be reserved for inventors, tradesmen, &c., who are connected with the hospital system or with sanitary work. We cannot be inensible to anything likely to further the interest of the London hospitals. There are some things, however, which lend themselves fitly to exhibition, and some which do not. We cannot say that, on the face of it, hospitals belong to the former class of objects; and there is some danger nowadays of injuring hospitals by the very methods that are adopted to help them. Great care will be necessary to avoid such danger in this project. With these qualifications we wish well to this exhibition.—*The Lancet.*

BINKO'S "AUTOMATIC" SPEAKING-TUBE.—The epithet "automatic" in the title of this tube refers to the fact that there is no external movable whistle requiring removing and replacing, the whistle being internal and the signal replacing itself after the whistle has been sounded. This is no doubt a great improvement on the movable whistle. There is a separate receiver for the ear, which is not required to be applied to the speaking-tube. An important advantage in this patent is that special fittings can be applied to each end of existing tubes, without the necessity for relaying the tubes.

NEW CLOCK AT THE PARISH CHURCH, CHELMSFORD.—A new Cambridge quarter clock has just been erected at the Parish Church, Chelmsford, showing the time upon two large external copper disks 7½ ft. each in diameter. The clock has Lord Grimthorpe's gravity escapement compensated pendulum; and has been made and fitted by Messrs. Wm. Potts & Sons, of Leeds, from instructions received from Mr. Frank Whitmore, architect, and Mayor of Chelmsford.

DECAYED PILES, LEITH PIER.—A number of the piles which for many years formed part of the West Pier, Leith, have (writes a correspondent to the *Scottman*) recently been taken out owing to decay. These are for the most part of Baltic redwood (*Pinus sylvestris*), but some are of elm and both kinds have been creosoted. The Leith Dock Commissioners have obligingly sent, through Mr. John Torry, W.S., some large pieces of them to the Museum of Science and Art. These were selected by Mr. Whyte, the superintendent of the docks, as parts which best showed the nature of decay. In the Museum there are two sections of similarly decayed piles, also of Baltic fir, taken out of Granton Pier in 1859, but which had not been creosoted. The case of both the Granton and the Leith piles, the destruction to the timber is the result of the borings of a small crustacean called the gribble (*Limnoria terrena*). Owing to the Granton piles not having been treated by any poisonous antiseptic, the creature had at once attacked the surface, but the Leith piles being protected by the creosote, a portion of the surface must first have been removed by a blow or otherwise to let it get at the fresh wood beneath. The latter, accordingly, have large cavities produced by the borings of the gribble behind the creosoted surface, some of which were occupied by mussels. Some of the creosoted piles which have been years in the pier at Leith are not decayed at all, and it may be stated that one piece, known to have been put in its place in 1847, still retains strongly the characteristic smell of the creosote. The elm piling is burrowed in a rather different way from that constructed of fir, evidently because the creature preferred to burrow the less resinous or softer portions of the latter. The burrows produced by the gribble are about one-fifth of an inch in diameter, and the wood is attacked by it at or near low-water level only. Great as had previously been the destruction of timber employed in piers and other structures within the tide-mark, the little crustacean which was, in great part at least, the cause of it, was not discovered till 1871, when Mr. Robert Stevenson, the engineer of the Bell Rock lighthouse, sent some pieces of timber it was engaged in boring to Dr. Leach, the naturalist, who described it. Mr. Stevenson found that the *Limnoria* bored many kinds of wood, but thought for a time that teak would resist its attacks. It only did so, however, for a longer time than more common kinds of timber. He eventually came to the conclusion that greenheart and beefwood would prove the most durable for piling. The greenheart tree is found in Guiana and adjoining parts of South America, and yields a very heavy, strong, and somewhat costly timber, which has been much used for piles in sea-water since Mr. Stevenson's experiments were made. It would appear, however, that its complete immunity from the ravages of the gribble for more than a limited number of years (in some cases it has kept sound for at least twenty) is now more than doubtful. The engineers of Granton

Northern Architectural Association.—Visit to the Ouseburn Board Schools.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

18,405.—**ORNAMENTAL WOOD, &c.** *J. Parker.*—According to this patent, wood materials and other pieces of any are ornamented by the introduction of metal plates, rods, rivets, &c., fastened on the wood in various ways.

19,097.—**WINDOW FASTENINGS.** *E. J. Beaumont.*—A method for sliding window-sashes is made with parts to catch on the outer sliding sash and to the inner sash, to inside lead or to the bead and lining together. When fastenings are used, a pivoted piece moves upon a long strap or bar, so that the outer sash or both sashes may be opened or closed through a limited range for ventilation. Provision is made for preventing rattling, and the windows are fully closed against dust and draughts.

19,130.—**BUCK KILNS.** *R. S. Jones and J. Lewis.*—A series of a number of furnaces arranged at intervals and the wall of the kiln, by means of this invention one place only is used, and that in such a way that the downward firing which is desirable in the burning of bricks is attained without the use of any paring walls of any kind, the brick-burning chamber-pockets or central uptakes. The furnace is arranged above the kiln, or on a level with it, or near the entrance, and communicates by a flue with a centre of the dome.

19,161.—**WINDOWS, DOORS, &c.** *C. S. Schumann.*—Windows, doors, &c., which move horizontally remain closed by means of a device, the mechanism is fixed to the wall laterally, and to raise or depress it before it comes to its settled position.

19,191.—**SANITARY DISINFECTOR.** *C. Leni.*—According to this invention, a vessel, the interior of which is fixed to the flushing pipe. This vessel has a perforated chamber contain the disinfectant and a controlling valve for allowing the admission of water and the emission of the steam.

19,235.—**COMPOSITION FOR DECORATIVE WORK.** *G. M. Atall.*—For coloring and some kinds of decorative work a composition is made of alum, talc, whiting, &c., ligated with oil, by means of which the coloring being applied by a workman. It dries and sets hard.

19,245.—**DRAIN PIPES.** *J. Dandy.*—An improved pipe, drains, sewers, &c., part of which can be readily adapted to the light by mechanism, which causes the door to swing. Two longitudinal sections are used, the upper forming a cover and the lower one a base. The two cemented together along the edges.

NEW APPLICATIONS FOR LETTERS PATENT.

October 2.—18,405. A. Ormrod and C. Whitehead, Machine Water-closets.

October 2.—18,453. A. Holmes, Hand-saws, &c.

October 2.—18,454. D. Keith, Window-sash Frames.—18,476. C. and T. Wyatt, Combination Mire Cut and Cramp.

October 2.—18,479. J. Westwell, Sash-board Fastener.

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Peckham, u.t. 71 yrs. g.r. 104, f. 641, 535f.; 10, 21, 28, to 30 even, and 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867,

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E. Richards 900
T. Webb 850
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New Music Rooms, Marlborough College.—Mr. C. E. Ponting, F.S.A., Architect.....	Double-Page Photo-Litho.
Irish Industrial Village, Chicago Exhibition.—Mr. Laurence A. McDonnell, Architect.....	Double-Page Ink-Photo.
Scenery and Geological Structure.....	Two Single-Page Ink-Photo's.

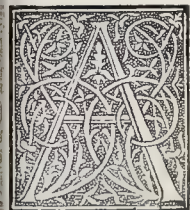
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Remains of Winchcombe Abbey, Gloucestershire.



At last, some information is forthcoming with respect to the position and the form of the great Benedictine Abbey of Winchcombe. Founded early in the ninth century by

Kenulph, King of Mercia, it took rank at an early period with the most important foundations of the district. It was here, on the day of the dedication, that the kingly founder released Eadbert, King of Kent, whom he had taken prisoner, before the high altar. The narrative, rendered by William of Malmesbury and other old chroniclers, relates many details of the imposing ceremony of dedication, and indicates that the establishment erected at this early period was one of considerable importance.

Nor does it appear ever to have been less so, except, indeed, it may be, during the Danish troubles. The story of the murder of the little son of King Kenulph, the sainted Kenelm, at the instigation of his sister, Quendrida, and the discovery of his remains, with their translation to the Abbey at Winchcombe, has been told again and again, and it need not be related here, except to say that far from decreasing the importance of the Abbey, the possession of the relics of the murdered saint added considerably to its revenues and its fortunes. A great fire is recorded to have happened in 1151, which appears to have destroyed the monastery, and it may have suffered again when the town was burnt in the time of Henry II. However, the buildings must have recovered from these disasters, for we find that the church was one of the numerous ecclesiastical buildings in the district which were consecrated in the year 1239, probably on account of the injunctions of the Synod held in London in 1237, when it was enacted that all churches not previously consecrated should undergo that rite within two years. This points to the completion of the church at an earlier period. The Abbot of Winchcombe was summoned to Parliament in 1265, and it has always had a place in the list of mitred abbeys. The monastic buildings were fortified by licence 47th of Edward III. (A.D. 1374), and Leland records that, at a later period, Richard Kyderminster

(A.D. 1488) enclosed the Abbey towards the town with a main stone wall *ex quadrato saxo*. The importance of the Abbey is shown by its income at the Dissolution, when it amounted to 759*l*. 11*s*. 9*d*. per annum, a sum equal to over nine thousand pounds of modern currency.

The history of the Abbey ceases at the Dissolution. No writer of a date later than that event makes mention of any remains of the buildings, all of which appear to have been swept away soon after the departure of their inmates. Attracted to the site by the importance of the establishment, Browne Willis paid a visit, in 1714, purposely to see if any remains could be traced. He found none of the great church of the monastery, but found the very site of the buildings levelled and turned into arable ground, and it was impossible then to form any conjecture where they stood. He learned from tradition that they had been on the east side of the present parish church, and that the main tower of the Abbey was large and fine. He found some mean offices at some distance from the church, where the Abbot's ploughman was said to have lived, and he records that no one could give him the least description of any part of the Abbey, or that any more buildings were remembered as standing within living memory.

A visitor to Winchcombe will find the town to be built almost entirely of limestone, grey with age. The houses, mostly of small size, nestle together in one of the valleys of the Cotswold Hills, and are grouped around the straggling High-street and the Town Hall. A fine church of late fifteenth-century work, with a bold tower at the west end, rises at the west end of the town, and close to it, on the opposite side of the roadway, is a charming gabled house, said to have been erected by Inigo Jones, who has the credit, by the way, of the erection of several buildings in these parts. To the east of the church a walled enclosure of garden and orchard is marked on the large scale Ordnance map as the site of King Kenulph's Palace. It rises about 10 ft. above the level of the roadway at its extreme east end. In the rear to the north, at some distance from the High-street, are two or three modernized houses, in which a few remains of old work may be apparent to an attentive investigator. These are still called the Abbey, and immediately adjoining them the site is marked on the Ordnance map as that of the lost Abbey. But the area here and all around is garden, orchard, and meadow. Adjoining, a pretty little Elizabethan doorway still stands to

mark the site of a good mansion, removed early in this century. A few really ancient houses remain in the town, among them being an old inn which is said to have been used by pilgrims to the Abbey. These complete the objects of interest in the quiet and secluded little town, far removed from railways and the busy traffic of men. This is the present state of what was once the capital of the Kingdom of Mercia, the chief town of the county of Winchcombe (for it gave name to such), and which was once a walled town of importance and strength. Indeed, it may be doubted if any travellers would be attracted to it but for the famous Sudeley Castle, whose towers are visible again and again among the distant trees.

During the past year the old Cartulary of Winchcombe Abbey was investigated by the Rev. David Royce with a view to publication, followed before its close by the actual issue of the first of two volumes to be dedicated to the subject. Mrs. Dent, of Sudeley Castle, took a great deal of interest in this work, and it occurred to her that the second volume would be more complete if there could be added to it some record of the form of the Abbey buildings, if it were at all possible to obtain any information of them. She accordingly resolved to carry out a long-cherished idea of having some excavations made, to see if spade and pick-axe could throw any light upon the subject. Mr. Loftus Brock, F.S.A., being then engaged upon some building works for Mrs. Dent at Sudeley Castle, very gladly volunteered to superintend the contemplated works, and, accordingly, they were placed under his direction. Before anything could be done the actual site of the Abbey had to be found, and towards this there was no fragment of ruin visible above ground, although here and there slight irregularities and inequalities of surface were apparent. Mr. Brock first directed his attention to the existing houses, where he had noticed traces of ancient work many years previously. His survey revealed the fact that beneath a mass of modern work there was a good deal that was ancient, and the roofs proved to be of good fifteenth-century work, now cut up into various rooms or obliterated, but once extending continuously from end to end. To the north and in the rear of these buildings is a pond, known to have been once much larger in extent, which was no doubt originally the fish-pond of the Abbey.

Here, then, were some data to work upon. The existing buildings, which ap-

peared to be adjuncts only of the Abbey, were likely to be adjacent to the usual arrangement of Chapter-house, dormitories, cloisters, and church, rather than for all the latter to be separated from them by the fish-pond, and to be placed on the opposite side of the latter, where, by the way, the site was hardly large enough. Acting upon the idea, therefore, that the arrangement was that of a monastery with the usual buildings on the north side rather than on the south, the most probable position for a large church appeared to be to the south of the houses, on the vacant land between them and the High-street. The position was accordingly laid down on the Ordnance map, and on this being determined upon, a tentative trench was dug across the ground on the corresponding spot. It at once revealed a mass of buried walling at each end. The workmen were then set to trace the contour of the walls, and while one mass proved to be a detached pier, the other was found to be a massive wall running east and west. All hands were set to work to clear it until the course was stopped by the boundary of the property being reached, the site being divided into strips belonging to various owners. However, leave to extend the excavations was, in the sequel, given to Mrs. Dent, and the excavations were extended at both ends until finally stopped at the east by the boundary of Mr. Geo. Smith's kitchen garden being reached, and it was impossible to prolong the search in this direction.

The wall proved to be the south aisle wall of the Abbey church, and the pier was one of the nave arcade, dividing it from the aisle. A cross trench was then dug northwards, which laid the north wall open to observation, and this was cleared until the west front was reached at one end, and the north transept at the other. Trenches were then dug to the north and to the south of the nave and aisles, but with indifferent success, for while evidences of buildings were apparent all over the site, in the way of enormous quantities of mortar and plaster from demolished walls, with here and there a piece of worked stone or broken moulding, yet no portions of foundations were met with. Nothing whatever was found of the south transept except a small piece of walling at its junction on the west side with the south aisle of the nave. It soon became apparent that the walling wherever met with was too rough to have been visible above ground, although it extends into the earth for 5 ft. or 6 ft. where it is undisturbed; and it was at length forced upon the notice of the explorers that all above the original floor-level had been demolished. This was proved by the discovery of a few paving stones in their original position, in one spot adjoining the north wall of the north aisle, where a short length of walling was actually found, about 9 in. high, above the paving, the inner face being of fair work. This small portion is, in fact, the whole of the masonry that was found to be above the floor-line of the interior of the church. At the west end, the southern return of a mass of walling which was afterwards met with, revealed two courses of wrought masonry in position, one of them being part of a chamfered plinth of fourteenth-century work, which had formed portion of the exterior of a large turret. It had a well-defined return mitre, showing the projection of the turret from the face of the south wall. These solitary fragments are all that remain of the great Abbey church above its original level—all the rest has been carefully and systematically demolished.

After the process of removal, the mass of plaster already referred to must have been levelled over the entire area, burying the foundations, which being of rough walling and not of squared stone, do not appear to have been worth entire removal, although in places even this was done—notably, as has been mentioned, on the lines of the south transept and on the site of the monastic buildings. The present ground level is about 18 in. above the original pavement of the nave. The earth is only a few inches in

thickness, in which a large number of fruit trees have precarious root, the remainder being formed of the broken mortar and *debris* of the demolished buildings. The site of the chancel and all to the east of the nave has fared still worse; for since these portions would have been raised by steps to some higher level than the nave, it follows that the present ground level must be beneath that of the original floor line. With results so disappointing as these, the explorers turned their attention to the tracing of the rough foundations, where they could be met with, and accordingly they were followed wherever they were reached. By this means, three out of four masses of masonry were laid bare, which were found to be those of a large central tower, at the junction of the nave and the transepts. It must have been at least 40 ft. square, and it was, doubtless, the tower, the tradition of the existence of which had been mentioned to Brovne Willis. The foundations, of the north transept were met with in a very mutilated condition, but their great depth had prevented their entire removal. They are of very massive description. A building was found to have once joined on to them on the north, doubtless the Chapter House. Search was made for the foundations of the cloister wall, but although several cross trenches were cut, no walling was met with. Indeed, a few feeble pieces of walling, 80 ft. away from the north side of the nave, was all that the excavations revealed of buildings on this side of the nave. The west front was cleared from end to end, and it was found that there had been two turrets or small towers projecting beyond the walling of the front. These measured 15 ft. and 22 ft. respectively on their west faces, the larger of the two being on the south side, the projection being 2 ft. 4 in., and the width of the front between them being 33 ft. 6 in., the entire width from north to south being 70 ft. 6 in. Traces of Decorated mouldings and of window tracery pointed to the west front having been of fourteenth-century work, with, most probably, a large central window. The front came within 208 ft. of the east end of the parish church, the axes of the two buildings being somewhat different; and the appearance of the two large churches nearly in line one with another, must have been remarkable. The foundations of a wall were met with running obliquely towards the present entrance to the two "Abbey Houses," which is close to the end of the parish churchyard, as if to confirm the passing notice in the "Land Book," that the entrance to the monastery was to the east of the parish church. On the south side of the south aisle, however, some projecting pieces of walling and a gap in the aisle wall led to the belief that a south porch, as at Gloucester Cathedral, had once existed there. Its position would have been convenient for easy access from the High-street close at hand. This would have been divided from the entrance to the monastery by the oblique wall. A great many fragments of zigzag ornament were found among the rubbish, which indicated a date, for whatever may have stood there, of about the middle of the twelfth century. The position of the church being obviously so close to the modern High-street, the extension of its axis to the east pointed to the rising ground, where the level is about 10 ft. higher than that of High-street itself.

Much expectation was raised in the minds of the explorers that here would be found some important traces of the east end, and perhaps a projecting Lady Chapel, as at the Abbey Church of Evesham, and elsewhere in the locality. The site here is bounded by an old thoroughfare called Chapel-lane, approximately at right-angles to High-street, along which the enclosing wall of the monastery appears to have extended. This portion belongs to Mrs. Newman, whose house, on the opposite side of High-street is probably on the site of the Palace of King Kenulph, which is known to have been at Winchcombe. Here a mass of ancient

walling existed until early in the present century, when it was removed. Leave was obtained from Mrs. Newman for excavations to be made, and a trench in the axis of the Abbey Church was set out, with others at right-angles, and exploration was begun by a body of workmen. Much disappointment followed. While the western parts of the site are of a gravelly subsoil, here it had been sand. All the sand had been removed to a great depth, with whatever buildings had stood in the way, and the whole of the sand-pit had then been used as a convenient shoot for some of the mass of plaster and mortar which could not be readily spread over the site. The trenches were carried down to a great depth, but nothing was revealed except the rubbish removed from elsewhere, with a few pieces of encaustic tile.

Since it was impossible to extend the trenches eastward from the site of the central tower to Mrs. Newman's ground, owing to the intervening strip of kitchen garden tenanted by Mr. Geo. Smith, the excavations were brought close up to the boundary of the latter on the west, and the foundations of a long length of walling were traced quite up to the limit, and were found to go beyond it. They mark the south aisle of the Presbytery. With this work the excavations ceased, leaving the north-east pier of the central tower unexcavated, beneath the soil of the kitchen garden.

Only the foundations of a single pier dividing the nave from the aisles, and traces of another, were met with. But the architectural evidences showed by some fallen stonework that the piers were huge circular pillars, of Norman date, similar to those existing at Tewkesbury and Gloucester, and formerly at Pershore, all Benedictine churches in the same neighbourhood. It may be taken as evidence of the existence of a local style in the middle of the twelfth century. An arch stone or two were also found, having a bold roll-moulding on the face. The Presbytery appears to have been in the same Norman style, since a similarly moulded arch stone was found on its site.

Traces of reconstruction were visible in several places, and in the north-west angle of aisle and transept, one-half of a trefoil-headed lancet was found built up in rough masonry as old material. To the west of this relic, a piece of walling was found formed of Roman mortar, of bright red pounded brick, evidently brought from elsewhere, and indicating pretty clearly whence some of the material was obtained by the builders of the Abbey, many Roman buildings having existed in early times in the district.

Close to the north-west angle a small opening was found in what was apparently the oldest part of the masonry. It appeared to be a doorway of a smaller building—probably of the Saxon west front of the original church. The belief was strengthened by finding an interment a good deal to the west of it, apparently of a person of importance. The skeleton, which lay east and west, was set around with rough upright slabs of stone in very primitive fashion, and the blackness of the earth all around led to the belief that the interment, although afterwards enclosed within the north aisle of the extended Norman nave, had once been in an open cemetery. The tomb had, in the fourteenth century, been enclosed with panelling, erected above the level of the pavement, as an altar tomb, portions of the moulded work having been found. Its position is close to the small portion of the original paving, which still remains, and which is reddened by the action of some great fire—probably that of 1151. A stone coffin was found in a broken condition to the east of the south aisle pier, and a fragment of another was met with outside the south wall of the Presbytery. A great many portions of encaustic tiles were found scattered all over the site, together with a few whole ones. There are also a few plain tiles, red, green, and yellow, laid diagonally, in their original position at the west end,

although the face of the wall adjoining them had been removed. There may be a few more in position still remaining in the portions of the nave not laid open by the excavations. All the tiles found and the various architectural evidences have been removed for safe preservation to Sudeley Castle. The tiles date from the thirteenth century to the sixteenth, and are very diversified in their patterns. Although many examples have been observed in the various churches of the locality, none of the patterns now found appear to agree exactly with them. By Mr. Loftus Brock's consent, reproductions of some of the sketches of the patterns are given. Fully thirty different patterns have been observed.

The dimensions of the Abbey appear to have been smaller than those of the other Benedictine foundations of the neighbourhood. The width of the nave and aisles was 57 ft. 4 in., the length of the nave, 116 ft. 8 in. The total probable length of the north transept was 38 ft., with a width of about 30 ft. The total extreme length of nave and Presbytery was probably about 280 ft., making allowance for the fact that the east end was not met with.

These dimensions may be compared with the Norman naves of other great churches in the locality which follow. They are obtained by scale from various published plans of sufficient accuracy for the purpose.


Great Malvern Abbey	68 ft. wide by 85 ft. long.
Hereford Cathedral	72 " by 144 "
Tewkesbury Abbey	72 " by 160 "
Evesham Abbey Church	76 " by 122 "
Gloucester Cathedral	81 " by 180 "

The smaller size of Winchcombe in comparison with the other minsters of the district is apparent from the above figures. The circular pillars of the nave were about 5 ft. in diameter, while those of Evesham are 5 ft. 6 in.; Tewkesbury, 6 ft. 4 in.; and Gloucester, 8 ft.

While the axis of the parish church is due east and west on the large-scale Ordnance map, that of the Abbey church is inclined 163 deg. north of east. The whole of the excavations, we understand, have now been filled up, and the site restored to its original appearance.

The thanks of antiquaries are due to Mrs. Dent for her expenditure of money in having the excavations undertaken, and to the various tenants and owners of the ground for allowing their lawns, orchards, and gardens to be turned into a wilderness of siege-work trenches during the time of the operations.

MARBOROUGH COLLEGE.


 MONG our illustrations this week is a drawing of the exterior of the proposed new music school at Marlborough College, and this publication of the design for one of the new buildings at Marlborough furnishes an appropriate opportunity for noticing the recently-published history of the College.* With the general features of the foundation and progress of Marlborough College we are not concerned, but there are some points of special interest in this book to be noted. The town of Marlborough was at one time a chief town of Wiltshire; like many another in that and adjoining counties the railways left it high and dry. In Mediaeval times it was of some importance as a Royal residence, a considerable castle being in existence. In the reign of Edward III. "it was still a fortress of some importance," but in the fifteenth century it fell into decay and ceased to be of any value as a fortified building, though part of it continued to be used as a residence. In the time of Henry VIII. the property came into the possession of the Seymours, and after the end of the Civil War, in which

Marlborough suffered not a little, the Seymours of the time occupied themselves with rebuilding the house. But "about the end of the seventeenth century this was rebuilt by the representative of the Seymours, now once more Duke of Somerset, the castle site had not passed to the Bruces with the Savernake Estates." The authors of this work quote from "The Diary of Celia Fiennes," who in the reign of William and Mary rode through England. She speaks of it as "a great rambling building, but now most pulled down and newly building, they were painting it, good apartments for what is done but none furnished, and its but one wing, and is built with drawing dining rooms and bed chambers with closets and dressing-rooms and two staircases and some rooms above which is to have another such wing on the other side and joynd with a greate hall." This was the house which, on the death of the last Duke of Somerset became the property of the Northumberland family, and was almost immediately turned into an inn. "We lay at the Castle Inn at Marlborough" wrote Lady Vere in October 1751, "on Wednesday night, and could not help moaning over it as it was an ancient habitation of the Seymours. Lord Northumberland has let it for twenty-one years. It has been opened about a fortnight, and it is overflowing with company continually." Placed on an important western road, it soon became quite a famous inn, but in 1842 the Great Western Railway reached Swindon, just as the lease of the inn was running out. No one appeared likely to continue so large a house as an inn. "At this juncture a committee was looking for some convenient place to establish a cheap school for the sons of clergymen, and found it in the Castle Inn," and after various internal and structural alterations, in August, 1843, it was opened as a public school, two hundred boys flocking to the old halls of the Seymours. Such was the beginning of a school amongst the most important of our day; castle, mansion, wayside inn, and public school succeed each other, the latter expanding in size and gradually spreading its buildings beyond the original site.

No site, indeed, could have been better chosen; the situation on the side of the downs was eminently healthy; the old Queen Anne house formed an admirable nucleus for further buildings, and thus it came about that by the year 1848 an additional house had been erected, and also a chapel, the architect of which was Mr. Blore. This chapel cost between six and seven thousand pounds, and was being continually improved at considerable cost, until it was found to be too small for the size of the school. It was pulled down and the new chapel was opened in 1886. This building, from the designs of Messrs. Bodley & Garner, is well known, either from personal inspection or from drawings, to many of our readers; it holds a conspicuous place in the noteworthy buildings of recent years. But a moral which attaches to it is that if the original chapel had been so built as to be capable either of enlargement or of holding a larger number of persons, much money would have been saved. For the original cost of the first chapel, in truth a comparatively modern building, was largely thrown away. We have, in following out the building of the two chapels, advanced somewhat out of order of time. A building of considerable importance, the Bradley Hall or Bradleian, as a memorial of Dean Bradley, a former headmaster, was erected in 1873; it contains many excellent casts from the antique, so that whilst boys in the higher forms are studying Greek literature, they are able to form some acquaintance with Greek art at a time when the mind is most open to impression. It is too much the fashion in public schools to treat the Greek language as a purely grammatical medium, and the full value of an education in the Greek language is incomplete without a knowledge both of the history and its art.

In 1883, a block of new buildings, containing among other things a natural history museum, was added to the school, so that since 1843 the old mansion of the Seymours has become but one block among several. It forms one end of what may be considered in a sense an irregular quadrangle, of which the gates and porter's lodge on the Bath-road form in a sense one side. Another noticeable feature has been the building of masters' houses at a distance in considerable numbers, so that quite a group of dwelling houses in good taste and well planned is to be seen on what not many years ago was but the bleak edge of a great Wiltshire down. Another point of interest and importance is that the history of Marlborough College shows the value of good sanitation. Before 1870 outbreaks of scarlet fever and scarlatina were frequent: in that year one of the worst occurred. "Meanwhile the authorities set to work in earnest to prevent such a calamity for the future. The drains were of course overhauled. Ventilators were added to dormitories and class-rooms," and the numbers sleeping in the dormitories were reduced. The yearly outbreaks then ceased and the sanitation of the school was regarded as satisfactory by competent authorities. Hence we see that even on a healthy site disease will prevail if sanitary conditions are imperfect. Can we be astonished, then, that if in a healthy place, where boys were well clothed and well fed, sanitary defects allowed a disease such as scarlet fever to appear frequently, it is constantly present in portions of towns and villages where all the conditions are so much more favourable for its growth? Indeed we may fairly cite the history of Marlborough College as an example that the true defence against many diseases is good sanitation. But not only must there be good sanitation to begin with; constant supervision is necessary, and it is one of the most common fallacies that if a dwelling-house has been supplied with a proper system of drainage it can be left to take care of itself. Perhaps the moral we have drawn from the sanitary improvements of Marlborough in 1870 is the most valuable lesson to be learned from this book; but the extraordinary and successful growth of the school, the gradual aggregation of noticeable buildings around the original mansion of the Seymours, the previous history of the site, the fluctuations in the town of Marlborough itself during centuries of time, give to the history of the school and town an uncommon interest. For we are able to follow by its means historical and social changes in a limited area, which put before us with singular vividness the facts which in the aggregate make up the materials of history.

NOTES.

 HE Mayor of Sheffield and his colleagues have abandoned, for the present, their endeavour to bring about a settlement of the coal dispute; being convinced that "it would be unwise to make any further suggestions at present." With no acceptable suggestion forthcoming from any other source, with the masters offering no further concession, and the men, as at first, resolutely declining to offer or accept any concession whatever involving the surrender of any fraction of their 40 per cent. advance, the question still seems far from settlement. The public are still perplexed by the widely-differing statements as to the actual amount of the "living wage," and the nature of the necessity which constrains employers to risk being considered hard-hearted by insisting on a reduction. Some of the latter have now, with a natural reluctance to let everyone into their business, published the results of their trading for the half-year preceding the lock-out; proving that they were working their colliers at an actual loss. Nor, as we have previously pointed out, are their statements disproved or weakened by the fact that kind-heartedness or a natural inclination to make hay while the sun shines, has led

* "A History of Marlborough College during Fifty Years: from its Foundation to the Present Time." By A. G. Bradley, A. C. Champneys, and J. W. Baines. London: John Murray. 1893.

to the re-opening of certain pits at the old rate of wages. By the way, it is fortunate for the coal-owners who have thus cut adrift from their Federation, that they are not members of a Trades Union, or their position would be very unenviable—not to say perilous—and the terms applied to them would certainly be very unparliamentary. Of course, nothing of this happens, but if a section of the miners make an effort to cut adrift from their Federation, they have to be protected by a strong force of police. So much for the different results following the carrying out of an independent policy—without presuming to offer any opinion as to the policy itself. Bishop Ryle sorrowfully confesses that he does not know enough of the merits of the matter to be able to make any move in the way of peace-making, and until the conflicting evidence which is constantly being produced is sifted by an impartial tribunal, we must shake our heads with the good bishop, sympathise with the thousands of innocent sufferers, and "wish for the day."

AS already is known to many of our readers, scarlet fever has broken out among the boys at Christ's Hospital, and the school has been temporarily broken up. At the meeting of the City Commission of Sewers on Tuesday last the Medical Officer of Health for the City of London stated, as reported in the press, that "the sanitary condition of Christ's Hospital rendered it absolutely impossible for its further continuance for residential purposes." And he added "he had been somewhat shocked at the present condition of things." We have over and over again stated our opinion that the large public schools should be periodically inspected by competent sanitary experts, so that the sanitary state of such institutions may be kept up to the mark. Of all places in the world a school of young persons is the most likely one in which epidemics such as scarlet fever may break out, and it has been demonstrated that the way to check and prevent such an outbreak is by the buildings being in a thoroughly sanitary condition. The outbreak at Christ's Hospital appears to show that in saying that there should be a periodical inspection by a sanitary expert of the public schools we did not go far enough, and that the time has arrived when such inspection should be made compulsory by law, and that it should be made by an expert appointed by the Local Government Board, to whom the report should be sent, and the Local Government Board should have power to oblige the authorities of the school to do any work or take any steps which may be considered necessary, in order to put a school in an efficient sanitary state. That one of the great schools of England should be condemned as unfit for residential purposes is ample evidence that the governing bodies of these institutions must no longer be left without control in these matters. But it raises a further question—namely, whether the large public schools should not forthwith be examined by a commission of experts, with a view to ascertaining their actual sanitary condition. There is no reason to suppose that Christ's Hospital is the only school which is in a bad or indifferent sanitary state.

WE regret to hear so bad an account of the state of Norwich Cathedral as was given at the meeting held last week at the Norwich Guildhall to consider how funds could be obtained for the reparation of the building. It appears that the Cathedral in places is not even weatherproof, and that many of the windows are so decayed that they must be entirely renewed—the tracery and mullions we presume. The following extract from the Dean's speech will give an idea of the unfortunate condition to which some parts of the building have been reduced.—

"In the next place the reparation of the eastern

half of the Jesus Chapel ought to be taken in hand at once. He grieved to say that all over the building the parapets were loose. In some places the parapets and the copings were gone, and the weather was getting into the building. There was one part of the wall which was bulged. The asphaltic channel which should carry the rain into the drains was gone. On the south side the parapets were of brick, covered over with cement. In the south aisle one bay was in a decayed state, and needed reparation. Next he came to the bay nearest the organ in the choir on the south side. Four hundred years ago that bay contained an organ. To insert the organ six beautiful Norman columns were cut away with their abacus and capitals. The organ was burned. After the fire the new organ was placed in its present position. Then the question presented itself, What was to be done with the bay from which the six columns had been removed, together with the abacus. Instead of repairing these columns or replacing them with stone, they were replaced by six columns of plaster. So was the beautiful billet moulding, and when the men were removing the ochre some of the billet wood fell down on the organ screen. He came now to another point. On the south side of the choir triforium there were three windows decayed beyond repair. The walls under the windows were of rubble, and the mortar that held in the pebbles was dead. The stones were falling, and only that week he had had an application from the architect to cover over the office skylight with wire-netting, lest persons employed in the office should be injured by the falling stones. The lead on the roof was in a shocking state; it was dented by stones falling upon it. Wherever the lead was defective water gained access to the building."

To repair the existing defects in a thorough manner 5,000*l.* will be required, a serious sum at a time when country landowners are so impoverished. We hope it will be obtained; Norwich is too interesting a cathedral to be allowed to fall into decay; though we sincerely hope that the work done will be confined to necessary repair, and that no drastic "restoration" will be attempted. From this point of view perhaps the difficulty of raising money may be a blessing in disguise; it will compel the restorers to confine themselves to what is practically necessary to render the cathedral safe, intact and seemly in appearance, instead of translating it into a modern church.

WE have only space to note one or two points of special interest in Professor Percy Gardner's opening lecture on Greek sculpture at University College. In discussing the early works of Pheidias, and especially the Athene, known as the Promachos, Professor Gardner stated what was probably new to most of his hearers—*i.e.*, that one of the Christian fathers saw and described a statue in the forum of Constantinople which was very likely the actual work by Pheidias. It had been brought there during the Frankish conquest of Greece; the figure is described as wearing the aegis and crested helmet, but as extending the right hand as though in supplication. This, of course, is manifestly impossible if the statue were the Promachos, but the hand holding the spear may have been noted and, if the spear had broken away, wrongly interpreted. In dealing with the later work of Pheidias, the lecturer gave some interesting details as to chryselephantine technique. A framework of wood was first set up, and on this the clay was modelled to the required form. When fairly dry it was cut off in sections, and these sections exactly reproduced in the more costly and less malleable material. A German artist has attempted in modern times to renew this technique. The experiment is an interesting one, but the lecturer held it to be an artistic failure as applied to portraiture. Veins were left running through the figure, and through these oil, or some other liquid, was poured to prevent shrinking. Oil was used for the Parthenon at Athens, water for the Zeus at Olympia, while the Asklepios at Epidaurus needed no additional moistening, as it stood over a well. Professor Gardner insisted strongly—and now-a-days when handbooks and histories of art are freely multiplied most opportunely—on the necessity of studying two things, the original monuments left us in museums, and the original literary sources as gathered together in Overbeck's "Schrift-quellen." Only by the study of

these—not by the absorbing of second-hand opinions—could a sound knowledge of the subject be attained.

THE Highways Committee of the London County Council, have, as we announced last week, caused photographs to be taken of a number of the obstructions which will shortly have been removed under powers of their London Streets (Removal of Gates) Act, 1893. The photographs are to serve, in the Council's own words, "as a memento of Old London." Since the gates, and the posts and bars are not, in themselves, objects of any particular beauty or interest (though their existence is, of course, a point to be remembered in the municipal history of the town), we imagine that the Council wish to show a future generation what kind of hindrances to traffic their forefathers lived with for many years. The question has two sides. In the residential portions of, for instance, the Bedford, Portland, or Grosvenor estates, houses have been commonly taken for the sake of the amenities to be enjoyed from a partial suppression of passing traffic. In the case of professional men, together with those who, like painters, and many architects, pursue their callings in their own homes, we can quite sympathise with the opposition the Council have thus evoked. On the other hand, the saving of time and directness of route that will be gained in commercial neighbourhoods are too obvious to be disputed. As touching the photographs, the Council have even yet a wide field left before them. In their schemes for street improvement the late Metropolitan Board of Works sentenced to death many a building whereof, so far as we are aware, they preserved no authentic picture, however merited. Perhaps, in the great and perfected by-and-by, photographs of, say, the Cobden Statue in Camden Town, the late Mr. Birch's Temple-bar Memorial, the Trafalgar-square Fountains, York-stairs Water-gate as it now stands in a hole of the Embankment-garden, or Lambeth Bridge, will be scanned with pitying amazement.

WE hear that the Berlin Common Council, which has a repute for the excellent management of its public works by contract system, has been disagreeably surprised by the proposition of Herr Borgmann, on behalf of the Labour members, requesting them to act as their own builders, or make certain conditions as to hours and wages when employing contractors. The proposal, which was based on some of the London County Council experiments, was received with ridicule and contempt as being entirely irrational and contrary to the interests of both employers, masters, and men. The local Press is of the same opinion as the majority of the Common Council, and condemns the proposed form of prohibiting free labour.

IT is a rare occurrence to hear of the contractor for a work having a memorial monument, however important his share may have been in the actual realisation of a gigantic scheme. The Swiss, however, have lately put up a monument at Chêne-Bourg in memory of M. Louis Favre, the contractor of the St. Gothard Tunnel Works.

THE contract for a railway tunnel under the Simplon Pass has been signed by the directors of the Jura-Simplon Railroad on the one side, and Messrs. Brandt, Brandau, & Co., of Hamburg, on the other. The cost of the tunnel will be 69,500,000 francs (or about 2,780,000*l.*), 47,000,000 francs of which are for the piercing of the single-line tunnel, which has to be completed first before the widening for the second line is taken in hand. The tunnel is to be ready in five and a half years, the fine for every twenty-four hours' delay being 200*l.* The contractors

will have to deposit securities to the amount of 40,000*l.* on starting the works. As the works advance, this sum will be gradually raised to 200,000*l.*, so that there may be an ample guarantee fund in case of unpunctuality.

WE have received from the Department of Science and Art the revised conditions in regard to grants for drawing in "evening continuation schools" in England, Wales, and Scotland. A model syllabus or course for drawing is appended to the document, with the note that masters are not restricted to it. It provides, among other things, that the materials used may be lead pencil, chalk, and water colours, but that the latter should not be attempted until some mastery in drawing with the pencil and chalk has been attained, which is a wholesome suggestion; also that practice in drawing with compasses, scales, rulers, &c., should be concurrent with freehand drawing. The course of instruction is divided into five sections of progressive nature, commencing with freehand drawing in outline from flat examples, and ending (Section E) with freehand drawing in light and shade with brush and colours. We regret to see that in Section C there is a repetition of a constantly recurring popular error about the meaning of "architectural mouldings." The work of this section includes "Freehand drawing in outline from casts of architectural mouldings." It is obvious that this does not mean mouldings in the proper architectural sense of term, as mouldings, unless treated in section, do not present any scope for outline drawing; what is meant is evidently casts or mouldings of architectural ornament, but no architect would understand the sentence in that way; it is a mistake that is constantly made by outsiders, and even by young architectural students, and it is a pity that the Department should have repeated and confirmed it.

THE acquisition of the Lewisham Hilly Fields as an open space is at length fairly assured. In response to the London County Council the Corporation agreed, at their meeting on the 19th instant, to sell for 2,000*l.* so much of the total area of 45 acres as appertains to the Bridge House Estates; and the County Council have ratified the purchase of 41 acres. Towards the entire purchase-moneys, 43,000*l.*, the trustees of the City of London Parochial Charities give 1,500*l.*, London County Council 22,000*l.*, Greenwich Board of Works 7,000*l.*, Kyrle Society 1,000*l.*, Lewisham Parochial Charities 1,000*l.*, Goldsmiths' Company 500*l.*, other City companies, 545*l.*, and the Duke of Westminster 300*l.* The land occupies an elevated site near Deptford, and will prove a signal boon to the inhabitants of some densely populated and poor districts in South-east London. The Metropolitan Public Gardens Association recently opened to the public the churchyard of St. Olave's, Silverstreet, E.C., and Goldsmith's-square, Hackney-road. The latter ground, being near Shoreditch station, was secured at a total cost of 4,500*l.*, towards which Mr. A. J. Scott, the Association, the Shoreditch Vestry, and the London County Council (in addition to their loan of 2,000*l.*) contributed. St. Olave's churchyard is at the west end of Silverstreet, and lies higher than the roadway, which, in 1865, at the Vestry's request, was widened by setting back the dwarf-wall and rails (erected by public subscription in 1797) a distance of 8 ft. The church was destroyed by the Great Fire, and was not re-built. Nearly opposite is Falcon-square Chapel, which was built in 1842, after the designs of J. Tarring, architect ("the Gilbert Scott of the Dissenters"); see the *Builder* of Jan. 8, 1876, and Dr. James Bennett's "History of the Church in Silverstreet, London." At No. 24, an old house in the street, is the Parish Clerks' Hall; on the front of No. 27 is a stone which seems to have escaped notice, bearing the Broderers' Company's arms—on a fess (*gules*) between

three lions passant, two broaches saltire-wise between as many trundles (*or*), but without the shield paly of six *argent* and *sable*.

UNTIL the setting up of the memorial which was unveiled last Saturday, no inscription or monument had marked the burial in Lasswade Churchyard of Drummond of Hawthornden. The present church was built about 120 years ago. Professor Masson, in his *Life of the poet* (1873), writes:—

"In a portion of the well-kept churchyard . . . there is the fragmentary outline of the smaller old church. . . . Drummond's own aisle, abutting from one part of the ruined wall, is still perfect, a small arched space of stone-work, with a roofing of strong stone slabs, and a grating of iron for doorway. Within that small arched space Drummond's ashes certainly lie."

In the same enclosed portion of the burial-ground is the tomb of Henry, first Viscount Melville, the statesman, whose descendant, the present nobleman, unveiled the memorial, consisting of a bronze medallion, set in a carved block of freestone, inscribed with the lines the poet wrote for his own epitaph, and built into the wall of the family vault.

THE *Quarterly Review* heads its new issue with an article under the title "Chicago," at the head of which "The Official Guide to the World's Columbian Exhibition" is inscribed as one of the books under review. The article, however, a very able one, is political rather than artistic, Chicago being taken as the type of new American life and development. An article on "The Modern Hospital" is ostensibly a review of Mr. Burdett's book, but it is written from the medical and administrative point of view entirely, and does not deal at all with the subject of the planning and sanitation of hospitals, which form the principal interest of the book in question, after all. The medical and administrative side of the subject is the one of most interest to the general reader, no doubt; still we regret that a notice of a book of this kind in an important review should leave on one side the history and present conditions of hospital construction.

THE "Kent and Essex Brickmakers' Protection Association" send us three specimens of stock bricks and three of machine-made bricks, both sets taken from the fire at St. Mary Axe, and ask us to observe how little effect the fire has had upon the stock bricks as compared with the machine-made bricks. It is quite true that the surface of the machine-made bricks is all disintegrated and they have lost their metallic ring (if they had any), and the stock bricks seemed sound and merely discoloured. But unless we knew in what part of the fire each specimen was, and whether or not they were subjected to the same heat, the comparison is of little practical value.

THE Photographic *Salon* at the Dudley Gallery, though there is more there of distinct attempt to use photography for the production of artistic effect and expression than in the collection at the Water Colour Society's rooms, does not do much to alter our opinion that in general photography used in this way only serves to show us how much we owe to painters. Look at the attempted idyls of the seashore, "Coming Boats" (61) and "Wild Weather" (67), with their absurdly unsentimental big-footed figures; or the commonplace family group "The Ghost Story" (136). Mr. J. S. Bernheim has achieved one or two pretty effects, as in "Verklärung" (139) and "Penserosa" (155), and Baron Albert de Rothschild has succeeded remarkably in a "Study in the Style of the Italian School of the Sixteenth Century" (185), but here he has had a sifter whose physiognomy thoroughly lent itself to the style and expression intended. Mr. Van der Weyde attempts to show us "Hypatia" appealing to the crucifix, but he has only succeeded in making a portrait

figure of a handsome woman in a theatrical attitude; there is none of the expression of Hypatia at that critical moment. Mr. Hollyer's portrait of "Mr. Walter Crane" (258), and Mr. H. Hay Cameron's of "Mr. Henry Irving as Becket" (268), are very successful and very effective, in the same kind of way as Mrs. Cameron's used to be effective.

THE Exhibitions of the Institute of Painters in Oil-Colours fluctuate very much in quality. The one now open is very much superior to the last one, and contains some admirable works. The President seems to have taken a turn towards the painting of landscape; his principal work, "Caught" (243) is remarkable chiefly perhaps for its admirable composition, which also includes in the scheme an exceedingly picturesque old farmhouse. It may be doubted whether Sir James Linton will achieve the same unquestioned success in this style as he did in his superbly-costumed figures; but the new experiments of so gifted an artist are at any rate always a matter of interest. Among the attractions of the first room are "A Witch" (37) by Mr. John Collier, a girl in bed with a black cat nestling up to her—the face seems rather dull and brown in colour; "Miriam," a girl's portrait (89) by Mr. Philip Burne-Jones; "Dolce far Niente" (99), a sketch of women round a fountain, by Mr. Brangwyn, a fine piece of colour; "Reading made Easy" (123), by Mr. Kennington, heads of an elder and younger sister facing the spectator and very brightly painted, the child a charmingly characteristic head; and "Faithful and True" (151), by Mr. Burton Barber, a dog picture of course, but a larger and more serious effort than is usual with him. Among other figure pictures are Mr. Shannon's heads of "Mrs. Shannon and her daughter Kitty" (291), a charming work; Mr. Dollman's "The Old Love and the New" (329); Mr. St. George Hare's "The End" (432); and Mr. Kennington's very fine study called "A Bacchante" (468), one of those pictures which are poems in themselves, and require no reference to the catalogue for their title, which is nothing in the matter. Landscapes worth noting are numerous—Mr. Aumonier paints "Sussex Brooklands" (96); Mr. Brewtnall has got a powerful sunset effect in "The Baron's Pool, Gunnersbury" (85); Mr. Wimperis, in his large picture entitled "Watering Horses" (117), seems to have been trying to show how near he could come to doing Constable over again, and with great success; Mr. George Wetherbee's "The Chalk Pit" (157) is a fine little study; Mr. Cotman makes a fine picture out of "Whitby" (223) seen in a bright but misty light; Mr. Fulleylove treats his familiar compound of hedges, lawns, and statuary charmingly in "The Terrace" (240); Mr. R. W. Allan's "Near Montrose" is an unusual and characteristic landscape; "Gathering Whelks" (353), with the gatherers forming dark patches on the shore, is a finer and more striking work. Among others we may mention Mr. C. E. Johnson's "Showery Day" (231), Mr. White's "Golden Grain" (236), a pretty study of bright sunshine effect; Mr. Hope McLachlan's "Pastoral" (275); Miss Swan's "Capri Shadows" (280), a very real bit of light and shadow; Mr. Waterlow's "Stonehaven" (337); Mr. White's "The Brook by the Sea" (373); Mr. John R. Reid's "The Road to the Pier" (510); Mr. C. E. Johnson's "The Cattle Pond" (561), an exceptionally beautiful work. Mr. Somerscales sends two sea pictures, "The Rescue" (130), and "Off Cape Pillar, Straits of Magellan" (415), the latter the most important, but it strikes us that he is rather overdoing his effect of dark bronzy sea.

CLERK OF WORKS APPOINTMENT.—Mr. Harry Henry, architect and surveyor, of the City of Durham, has been appointed clerk of works to the University of Durham.

THE EXHIBITION OF PAINTINGS AT CHICAGO.

THERE can be no doubt that the collection of paintings is a most important one, probably the most important of modern times, not even excepting that of the Paris Exhibition of 1889, at which the Germans did not exhibit, and which was, in consequence, devoid of much of that catholicity of treatment which is present at Chicago. Commencing with the American exhibits, we notice at once the strong French influence which permeates the whole collection, some of the best canvases being those sent by artists residing in Paris, though many are by men residing in Rome and London.

As may be inferred, an American school, as such, scarcely exists, the difference of handling in each of the paintings being brought about by the influence of the schools in which the artists have studied. There is a good deal in the worst French style, in which all the coarseness and vulgarity of its worst phases are painfully apparent.

In some of the smaller works, such as the landscapes, the subjects are treated with a certain amount of freshness reminding one of the best English work. Impressionism is met with here and there, but seems in general to have taken no great hold on the Americans as a body, while the figure subjects are numerous, and show an undercurrent of French influence in their handling. On the other hand, as was to be expected, the influence of the Munich and Düsseldorf schools is manifested in the pictures of those Americans who have studied there.

In the numbering of the pictures the senseless French system (or no system) has been adopted, so that if one wants to study the works of a particular artist, it is well-nigh impossible to do so, as the numbers do not follow in sequence as at the Royal Academy, and you are, therefore, unable to find any picture from the catalogue. A large number of the pictures have been exhibited before in Europe. As to the subject-matter, the range is very wide, covering as it does everything from the ideal and religious, through landscape, seascape, domestic *genre*, and portraiture. The only subject especially conspicuous by its absence is historical painting, which was to be expected, when one considers the comparative youth of the American nation, whose painters have not developed in an atmosphere of romanticism but of realism. The works of the older American painters who have felt the influence of the romantic period are, however, represented by scenes from American life and literature, and Mr. F. D. Millet's "Anthony Corlaer the Trumpeter," Mr. Hovenden's "Breaking Home Ties," are examples of this phase. As indicating the scope of the collection we may mention that there are over 1,100 pictures in the oil-colour section alone.

Among some of the more noticeable we remark:—"Christmas Bells," by Mr. E. H. Blashfield, exhibited, if we mistake not, in the *Salon* of 1892, treated in a purely decorative way. Mr. Blashfield, by-the-way, has done some of the best work on the Manufactures Building. Mr. T. W. Dewing sends his six figure subjects of the "Days," which are also treated decoratively, in a light key, the artist having more American character in his methods than many of the exhibitors. Among the religious subjects is the "Virgin Enthroned," by Mr. Abbot Thayer, treated in a novel manner, the Virgin being clothed in an olive green robe, with a pretty, wistful face, quite devoid of any religious feeling and treated in a purely material manner. Mr. Julien Storey sends his powerful "Made-moiselle de Tombreuil," an episode of the French Revolution, full of colour and animation, but with all the native artist's lack of finish. "The Flagellants," by Carl Marr, of Munich, is a very large canvas, perhaps the largest in the collection, and contains many half-nude men with blood-stained backs and scourge in hand; the subject is not an inviting one, but the technique displayed is beyond criticism.

As in other domains of art, so in painting, there seems, with the Americans, to be no general standard of excellence to which one can compare all the paintings, as in the European schools. "The Viking's Daughter," by Mr. F. S. Church, of New York, is an idealist study; the artist seems to be one of those who is tentatively striking in a new direction, and one feels sorry there are only two of his works in the Exhibition. Mr. Walter McEwen sends his "Les Sorcières," previously exhibited in the *Salon*, in which the lurid light of the fire plays somewhat cleverly on the faces of the principal figures. "The Passage

of the Red Sea" is a large canvas, showing Pharaoh pursuing the Israelites, full of life, movement, and colour, but of the blood and thunder type. It is by Mr. F. A. Bridgeman, who is almost a Frenchman, having lived in France since he was a youth, and we think we remember the picture in the 1892 *Salon*. Hard by is a charming little landscape, by Mr. D. W. Tryon, of New York, of a setting sun, and called "Evening."

Mr. W. T. Dannatt, of Paris, sends a picture entitled "Spanish Women," in which six women are seated in a row, with the glare of the footlights on them, and represents to our mind the worst phase of French art, in which the colouring is daubed on in a careless way, and which, we suppose, would go under the high-sounding name of Impressionism, writ large, but which, in this case, only covers up bad drawing. The "Peace," of Mr. Walter L. Dean, of Boston, is very satisfactory; it shows a man-of-war in harbour, with white painted hull, the water reflection being cleverly handled, and all the minutiae of the rigging faithfully rendered without any overworked effect.

Of the Munich-American school, Mr. Orrin-Peck's "Love's Token" is a good example, as also Mr. Toby Rosenthal's well-known "Dancing Lesson of Our Grandmothers," exhibited before at the Royal Academy, and afterwards engraved. Mr. Whistler, who, by the way, describes himself as "of Paris," although in the engraving section he states he is "of London," sends six of his canvases, mostly lent by English owners. Amongst the landscapes those by Mr. George Innes, of Montclair, N.J., who is one of the most free from foreign influence, are of the greatest interest. Mr. Innes sends fourteen pictures, many of which are treated with great breadth and freshness. Mr. Homer Martin, who also has a name for this branch of art in the States, sends four pictures, the most important being "Behind the Dunes, Lake Ontario." Among portrait-painters, Mr. Eastman Johnson and Mr. Sargent are well represented, and appear to take the lead in portraiture.

Mr. Winslow Homer, the great exponent of *genre* in America, sends fourteen works, in which he displays considerable insight into methods of portrayal of humour and of incident. From what has been said it will be seen how wide an area is covered and how difficult it becomes to select a representative number for discussion. It is a heterogeneous collection in which many fine compositions are to be found, treated with great variety of technique and varying degrees of excellence, and whose special characteristics are, in the main, drawn from the European schools in which the various artists have studied. The Loan collection consists of over 700 works from private galleries in the United States, which are, it is needless to say, mostly French; only four Englishmen are represented, and of curiously different schools: John Constable's "Weymouth Bay," and "Shepherd and Flock," and the "Lock"; George Morland's "Contentment"; three canvases by Mr. John M. Swan; and one, the "Portrait of Joachim," by Mr. G. F. Watts, R.A. The remainder are principally by Parisian artists, and contain certainly some of the best productions of the school since 1800 A.D. It is perhaps needless to mention the pictures, but the collection includes some of the best works of such men as Diaz, Corot, Rousseau, Millet, Delacroix, Decamp, Fromentin, Daubigny, Troyon, Meissonier, De Neuville, Breton, Mauve, Ingres, Gérôme, Fortuny, Manet, Degas, Cazin, and many others, which show how, in the past at any rate, the Americans have always had a most decided preference for the French school. There is a collection of over two hundred water-colours in the upper galleries, amongst the principal exhibitors being Messrs. E. A. Abbey, W. H. Gibson, F. D. Millet, Arthur Rotch, and W. T. Smedley amidst a host of others. The collection seems much freer than the oil colours from external influences, and in the landscapes especially there is a breeziness, airiness, and freedom from restraint which is very refreshing.

The collection of engravings, etchings, and prints is a very large one, consisting of more than six hundred, the principal exhibitors being Messrs. Carlton Chapman, S. Colman, Chas. Platt, Alex. Schilling, T. Alden Veir, T. M. Whistler, and others. Still more interesting, and placed under another group, are the pen-and-ink and wash drawings. To an Englishman these are no doubt far more interesting in a general way than the paintings. In no country has the cultivation of pen-and-ink work been so successfully studied as in America, nor, we think, with better results. This, no doubt, is really, as in most things,

brought out by the great question of supply and demand. The American monthly and quarterly publications have created a demand for the highest class pen-and-ink and wash work; these, added to the improved methods of reproduction, have raised the American magazine illustrations to a pitch of excellence never before attained, and it is therefore with a considerable amount of interest that one looks at the originals. There are close upon five hundred of these, and among the exhibitors are all the best-known men, such as Messrs. E. A. Abbey, with his Shakespearean illustrations; Robert Blum; A. Castaigne, with his sketches of incident; Kenyon Cox; Harry Fenn; C. D. Gibson, noted for his humorous work and figure subjects; W. H. Gibson; E. W. Kemble; Alfred Parsons; Chas. S. Reinhart; and many others.

Whatever we may say as to the school of painting, there can be no doubt that America has a school of black-and-white of which she may well be proud, and which in many instances rises far above what obtains in European States. The best men and the best talent are employed on this work, therefore we need hardly wonder at the art attaining the position it has. The collection here should do good in educating the British public as to what is being done in the States, and leading publishers here to feel the necessity for producing the best work possible to be obtained.

The Germans have apparently made a special effort to form a collection of their best works on this occasion, perhaps because of the patriotic wish to show their compatriots at Chicago (which has considerably more German than American citizens) what the artists of the old country are doing, and also perhaps to make up in some way for their holding aloof from the recent great Paris Exhibitions, where, for political reasons, they have not exhibited. The Düsseldorf, Munich, Berlin, Dresden, and Weimar schools, with others of less note, are well represented. A German, however, is nothing unless patriotic, and this patriotism is rather overdone when carried into the domain of art; as a consequence, we find the last three German emperors in every attitude and uniform. Apart from these there can be no doubt that it is a well selected collection, in which drawing and colouring are carefully handled and in which we do not find any of that restless striving after effect which is the great danger to the Franco-American school. In landscape, historical and domestic *genre*, and portraits the collection is particularly good. The larger room is fitted with a velarium, which is, we consider, a *sine qua non* for the proper and effective lighting of a picture gallery, and lastly, in striking contrast to the American section, is properly supplied with comfortable seats. One thing that strikes one particularly in the German gallery is the general sombreness of the colouring as compared with the French. In domestic *genre* the collection is particularly strong, as in Herr Eberle's "Boards," a work from Munich, in which a woman is surrounded by farm animals, portrayed by the hand of a man who evidently is fond of his subject and who has spared no pains to give us a faithful representation. If genius is, in truth, "the capacity of taking infinite pains," then surely there are many in Germany, and Professor Meyerheim's "Menagerie," from the National Gallery at Berlin, must be considered the work of one, for here, in a moderate sized canvas, animals and figures are huddled together with the greatest accuracy and completeness and with the same technical skill which is displayed in the elaborate ironwork of Medieval and Renaissance times in Germany, but which, being opposed to fitness and the material, was the ruin of their Gothic architecture, leading to the introduction of technical difficulties in stone cutting, merely for the innate love of conquering them by scientific skill. When we look at such works we remark the cleverness, but do not feel the art, and such an one the canvas under discussion appears to us; we remark the consummate skill and address with which the figures and animals are introduced, but the picture does not go further—does not, in fact, reach the higher domains of art.

Among portraits we notice that of Ibsen by Professor Smith, of Weimar, while of the many portraits of the Emperor there are three specially worthy of notice: that by Professor Koner, of Berlin, in which the Emperor is seated on horseback in the regiments of the "Garde du Corps," is a very imposing affair, as also that by Professor Saltzman, of Neubabelsberg, showing the Emperor whaling in the North Sea, and Professor Werner Schuch's large canvas of the Emperor reviewing troops is a fine composition,

and is remarkable both as a portrait and as a military painting.

The portrait of "Kossuth" by Mdme. Parlaghy, of Berlin, reminds one of the late Frank Holl's treatment with dark background and clothes, showing up the clear-cut features of a white-haired man with skull-cap. The portrait of Mommsen, by Professor Knaus, of Berlin, is a striking but not over-pleasing treatment, a man seated at a study table and looking straight at one in a piercing way, which is very unpleasant. Professor von Lenbach's portraits of "Prince Bismarck and Pope Leo," both lent by the State of Bavaria, are remarkable not only for the excellent likenesses they undoubtedly are, but for the scholarly treatment he has impressed on them; that of Bismarck in blue coat and soft felt hat is the most characteristic portrait of him that we have seen.

Among military subjects the "Sudden Attack" by Professor Brandt of Munich (by the way, every painter of any eminence seems to be a professor) is a fine conception; it is an attack on an enclosed farmyard, and is an attempt to portray one moment only, in which the alarm is given, the men mustering, the horses being saddled and made ready; the whole scene is one whirl of action, and is a subject which, in general, would be seized on by an impressionist; but here everything is complete; nothing is left to the imagination, and nothing is slurred over by bad drawing or colouring; it is an impression it is true, but one in which the camera would play the part.

In rural scenes and country life in every phase, the Munich School is especially good, while Professor Leitz's "Music," representing a small group of people seated, is a fair specimen of the school of domestic genre. "Salomé," by Herr Papperitz, with some fine colour rendering of drapery, the "Congress of Berlin," by Professor von Wernet, the "Death of Dante," by Otto Friedrich are also noteworthy, while the "Navy-yard" Herr Hochhaus, showing the construction of the German warship *Oldenburg*, must have taken years to paint. It is 12 ft. long by 4 ft. high, and hundreds of figures are at work at the side of the dock.

In the fields of allegory it is, perhaps, too much to expect the sober-minded German to roam with any degree of success, and it is rarely attempted. In one huge painting, however, 30 ft. long and 18 ft. high, Professor Keller, of Karlsruhe, has attempted to portray the "Apotheosis of the Emperor William I.," who is represented as seated in a car drawn by four horses, and followed by the Emperor Frederic and Prince Bismarck on horses, and preceded by outriders bearing the German flag, and surrounded by winged angels blowing trumpets, and about to place a crown of laurels on the Kaiser's uncovered head, the colouring and rendering of the whole conception being undoubtedly very fine.

The German collection has come as a surprise to the American public, and it will doubtless lead to a larger percentage of American students going to the German schools instead of all flocking to Paris, while it will certainly lead to a greater appreciation of German art by the American public.

Of the French section of the Exhibition we need not say much, partly because many of the pictures exhibited have been previously noticed by us when they appeared in one of the *Salon* exhibitions at Paris, and in fact we have for some years past commented annually on the condition of French art as illustrated in the Paris exhibitions; partly because, unlike that of Germany, the collection is not a fair representation of the present state of art in the country concerned. This is surprising as well as disappointing, as it had been understood that France was making special efforts to stand well at the Chicago Exhibition, and considering what appreciative purchasers French artists find in the Americans, it would have been expected from commercial considerations, if not for honour, that the French would have made every effort to appear at their best at Chicago. There are plenty of pictures—about seven hundred, but it can hardly be said that most of them represent the modern French school at its best, and those which do are already well known, and have been previously noticed in our columns.

Italy sends a collection of some two hundred paintings, which are no doubt illustrative of the state of the art in Italy at the present time. The modern Italian school seems to consist principally of any number of pretty and quaintly dressed peasant girls laughing and talking to one another, pictures in which the colouring is good and harmonious; and a certain number of sea-pieces and domestic genre inter-

mingled with scenes in which Venetian flower-girls, with St. Mark's in the distance, are arrayed in coloured gowns, softly blended; while some attempt higher art and portray a subject such as "A Village Fête," by Signor Armenise, into which are worked a certain number of figures, representing the joyous, laughing, and contented side of the modern Italian; in its way good art, inasmuch as it does this truthfully, in the same way as the men of Renaissance times never tired of painting the Madonnas and other Biblical subjects which embodied the religious feelings of those days. "A Charge of Cavalry," by Signor Mancini, is very cleverly done in a sketchy way, showing a long line advancing at extended distance, full of movement, the further end sinking over a hill in the middle distance.

Among landscapes especially to be noticed is the "Overflow of the Nile at the Pyramids," by Signor Corradi, representing a gorgeous sunset effect with the Pyramids in the distance. Signor Zanetti's pictures of Venice are well and truthfully studied, and his "Canal at Torcello" especially so, with the soft light effect of the grass and water, bringing it home with striking exactitude to anyone who has seen it. Venice, with the Italian as with the European artist, is always a favourite sketching ground, and "bits" of life and character from the Queen of the Adriatic abound, in which the architecture (not too well rendered) plays the part of the background. In general the Italians excel in small landscapes and sea-pieces, into which they throw a light and breezy effect entirely their own; and in the portrayal of fruit and still life they are admirable, as witness Signor Novo's "Fruit-seller at Venice," in which pears, apples, and fruits of all sorts appear jumbled together in a brilliant realistic manner. The subjects are all small. Signor Corbelli's "Angelus on St. Peter's Day" is among the larger ones, on a more ambitious scale, and shows a sunset view across the Campagna, in which gaily-clad peasants are harvesting.

As a general rule, although the level of the art of Italy at present is not high, it is something to be able to say that whatever is attempted is done well, and satisfies one in that respect, whereas anything attempted on a higher scale, and which fails, is always unsatisfactory.

The Belgian school is at once noticeable after France and Italy, on account of the sombre colouring. As in the Italian school, the Belgian canvases are much smaller than in the French and German collection. Sea-pieces are generally poorly treated, and of the muddy type, perhaps naturally inclined to be so under the northern sky, and possibly more difficult to render. The "Embarking of Emigrants at Antwerp," by M. Farasyn, is a busy quayside scene, in which emigrants of all types are preparing to embark to the New World, a scene which would naturally interest Americans, and in which a considerable amount of pathos and study of human nature is visible. We meet with pleasure the "Old Canal of the Roserie at Bruges," by M. Stroobant, a quiet rendering of one of the most pleasing of the old Belgian towns, in which, however, the architecture is somewhat stiffly treated. The curl of one huge wave by M. Bouvier is naturally and studiously rendered in a varying bright green.

From the figure subjects of Italy to the homely Belgian landscapes is a great change, as in those by M. Bayart and M. de Schampheeler, and others, in which quiet greys and browns predominate. The "Cupid in Chase," by M. Ooms, an interior with women bathing in a bath enclosed with marble-rim, rivals Mr. Alma-Tadema in the delicate texture of the marble. The most ambitious thing in the gallery is the "Holy Week in Seville," by the late M. de Keyser, a large painting showing a priestly procession; while the "Last Days of Pompeii" is perfectly childish, the result we usually find in what we may call the minor schools of painting when anything historical is attempted, in which imaginative fancy has to be joined to technical skill for any good result.

In groups of still life, in "bits" of red brick architecture as the "Brielle Pont, Ypres," by M. Meyers, or in the landscapes and canals by M. Courten, there is much to admire, both in selection of subject and rendering. Of portraits there are few, and only one which deserves notice, viz., that of the Congo Explorer, Jérôme Becker, of Antwerp, a fine portrait by M. Vanaise, with a view of the city in the distance, and giving, as it were, a local habitation to the subject of the portrait.

In the Austrian Section, more than any other, perhaps, one feels there is an inclination to really impressive religious painting; that is to say, in combination with good technique we find a religious

feeling prevails—the feeling of painters who do their work for love of their subject, and to whom the notice of the public is a secondary consideration. The collection is small, and consists of about one hundred paintings, showing, more or less, the influence of the German schools; this is especially noticeable in the type of paintings of which "Suffer the Little Ones to Come unto Me" is an example; it is by Herr Schmid, of Vienna. This old, well-worn subject has, perhaps, never struck one with so much pathos as in this canvas. The portraits are very fine, and especially that of George Washington on horseback, by Herr Huber, of Vienna, in which the head bears all that impress of character which one expects to find in a subject like this. The allegorical presentations of the "Five Senses"—Hearing, Feeling, Seeing, Smelling, and Tasting—are among the most noticeable in the collection; they are by Herr Mackart, of Vienna, consisting of five separate canvases of semi-nude figures, in which the flesh tints are very skillfully rendered, with dark backgrounds of trees and bushes, scholarly and refined compositions, and taking a place, half-way as it were, between the more sombre treatment of the German school and the lighter play of fancy and colouring of the French. In landscapes, the Austrians are particularly weak, and those sent resemble chromographs in smoothness of texture. Among military subjects, the "Never Retreat," by Herr von Payer, is dramatically treated in dark tones, while the historical rendering of the "Fenstersturz at Prague," by Herr Brozik, of Paris, shows a decided French influence; it is a large canvas, 18 ft. by 12 ft., and full of life and colour. It is, perhaps, in some of the smaller figure subjects of anecdote and incident that the Austrians are particularly fortunate, such as in the "Photographer" and the "Antiquarian," by Ludwig Gloss, and pictures of this type, rendered in a manner half-way between Mr. Dendy Sadler and Mr. Marcus Stone, while others which point a "moral or adorn a tale," such as the "Dice Throwers," by Herr Hamza, are singularly happy in conception and treatment. Among classic subjects, the "Prometheus," of Herr Hirschel, reminds one of Mr. Poynter's compositions.

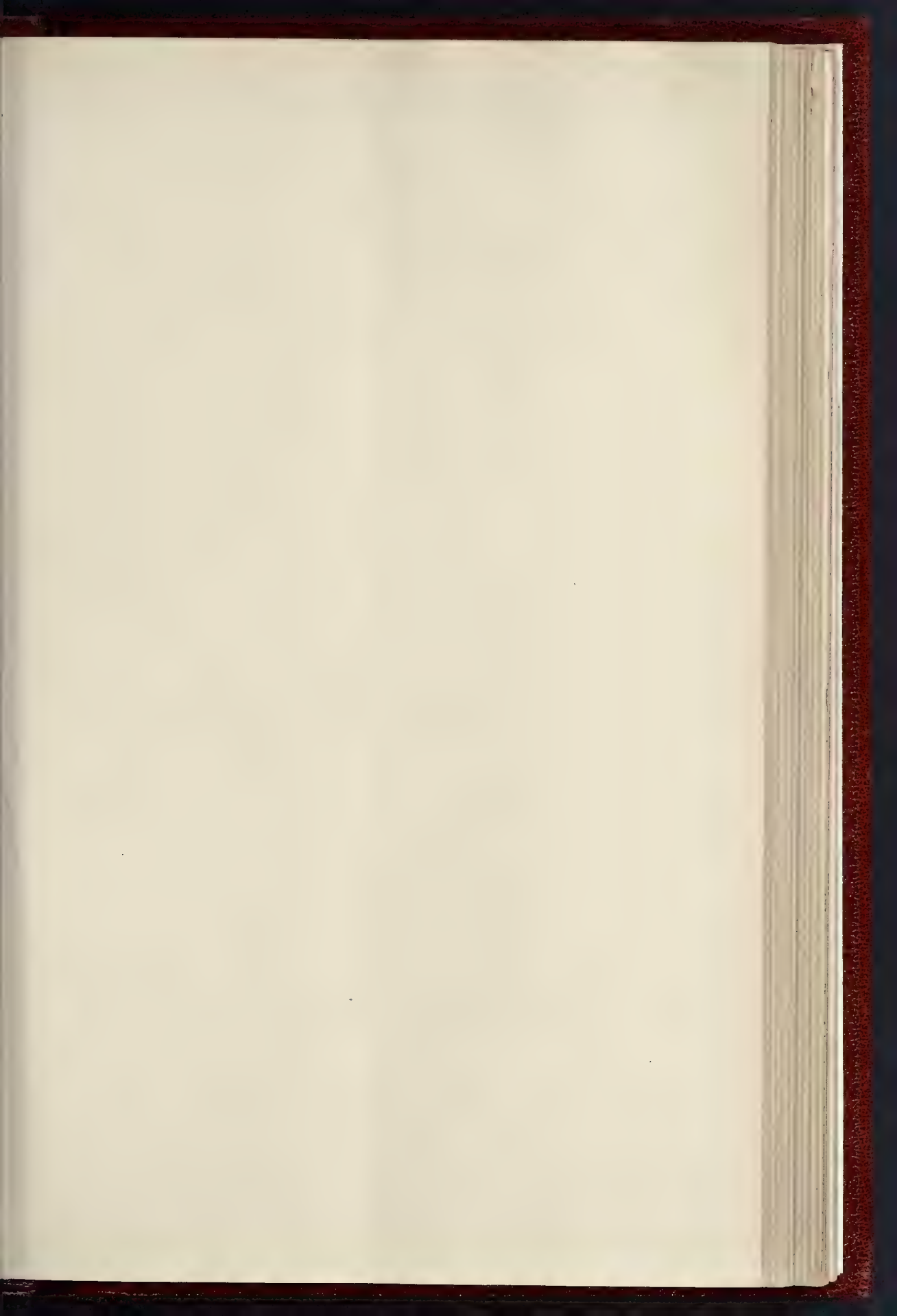
In a collection of about thirty water-colours, those by Herr Rudolph Alt, of Vienna, are particularly fine and interesting to architects by the choice of subject; his "Interior of St. Marks, Venice," contains very careful study of surface-texture, his management of the well-known screen showing considerable study of architectural drawing.

The "land of Rembrandt" sends a complete and characteristic collection of 200 oil paintings, besides over 100 water-colours. The restful and soberly coloured greys and browns in the landscapes, and the seascapes and views across the quaint dykes and canals, with bits of shipping, are very refreshing after the higher flights of the more important schools, and give us an insight as it were into the trim and homelike character of the people. The old almshouses and the like appeal especially to the architect as the prototypes of our most popular phase of domestic art. The study of the nude hardly seems to fit in with the Puritanical education of the modern Hollander, which would, no doubt, make glad the heart of the "British matron" and Mr. Horsley, R.A., while the want of it certainly makes itself felt in the drawing of some of the figure subjects. Among Dutchmen in London, Mr. Hubert Vos sends important contributions, and his portrait of the Queen of Holland is founded evidently on the old Dutch masters. A large number of women-painters exhibit—mostly in subjects of still-life.

As was to be expected with anything Spanish, with that delightful indifference to modern ideas, so very refreshing in these progressive days, we find that their pictures are neither numbered nor catalogued! In a country which has had such a glorious past, naturally one finds many historical canvases, and amongst them, of course, "The Landing of Columbus," while interiors of bull-rings, pictures of anecdote and incident and still life are prominent; the special characteristics of these lie in the vivid colouring and sunny atmosphere of Spain. There are one or two small military charges, almost impressionist in rendering, and with a certain dash and freshness always pleasing when not overdone. The picture showing Don Quixote and Sancho Panza is quaintly rendered with a considerable amount of humour.

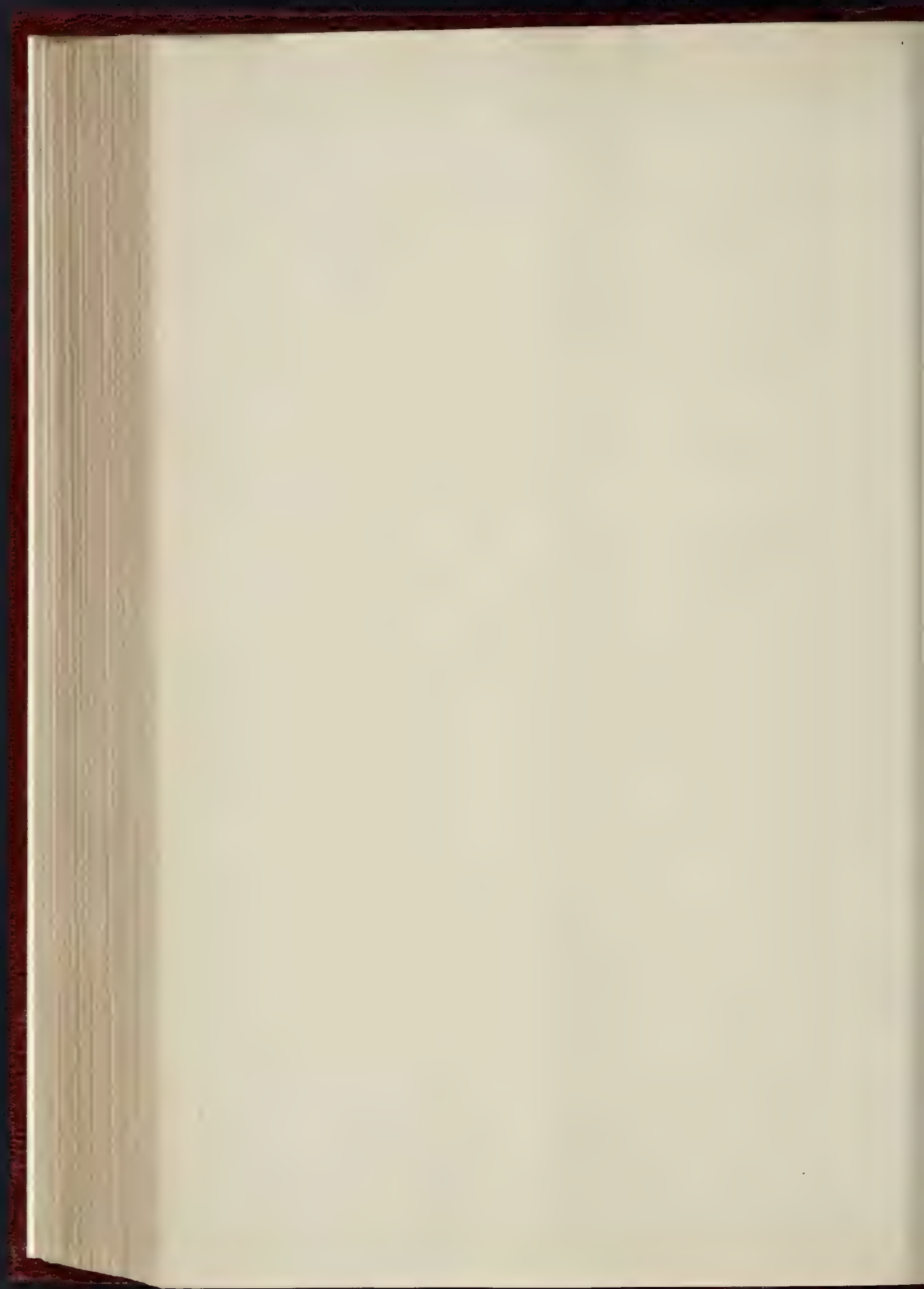
The Russian collection consists of over 100 pictures lent by the Imperial Academy of Fine Arts at St. Petersburg, many of which are quite modern, while others date as far back as 1860. The influence of France and Italy is clearly visible, while all have that brilliant colouring

It will be seen that an area of about three-quarters of an acre is deducted from the area to be purchased. It is proposed that this portion of the site should be left as an open space, and we have accordingly suggested to the Parks and Open Spaces Committee that they should acquire it for that purpose, and that the cost of purchase shall be borne by the Council. In our opinion, the Council should not be required to make any approach from Ponsoby-place. We propose, therefore, that the offer of the Government should only be accepted on the understanding that the Council is not required to make it, and that



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excluding the cost of acquiring this property from the estimate, the annual deficit will be reduced to 43s. 2s. 2d. It is desirable that the period within which the dwellings are to be erected should be extended to seven years. The estimate submitted is a full one, and it is expected that, should the Council decide to acquire the property, a saving on such estimate will be made. We have received an intimation from the Secretary of State that he will accept accommodation on the site for persons displaced in connexion with an improvement scheme under the Housing of the Working Classes Act, 1890, within two miles of the prison site. This is a very important financial consideration, and we consider that the value of this concession exceeds the possible loss to the Council, even on the extreme estimates which are presented. There is no doubt that the cost of housing schemes has been largely increased by the impossibility of making an economical use of the land. Should the Council decide at any future period to carry out one or more improvement schemes within the two-mile radius, the Millbank site could be regarded as available for the accommodation of the persons displaced, and the necessity of acquiring sites at a heavy expense would be obviated. The land cleared under the schemes could then be devoted to far more remunerative purposes than is at present the case. We recommend—

"That, subject to an estimate to be submitted by the Finance Committee in accordance with the statute, the Council do acquire about 10 acres of the rear portion of the Millbank-prison site at the sum of 2,500l. per acre, for the purpose of erecting thereon artisans' dwellings, on the understanding that the Council is not to acquire or make the approach from Pownonly-place, and that the Parks and Open Spaces Committee be debited with the purchase of the portion of the land to be left as an open space, and that such open space be laid out and maintained by that Committee."

The consideration of this report led to a long and animated discussion.

Mr. Westacott moved and Mr. Beresford-Hope seconded that the consideration of the question be deferred until the Council had the report of the Finance Committee on their conference with the Treasury regarding the financial aspects of the question.

After some discussion, a show of hands was taken, when a majority voted for the adjournment. A division was claimed, and the Council divided with the following result:—For the adjournment, 43; against, 55.

Mr. Boulnois, M.P., then moved and Colonel Rotton seconded that, in view of an offer which had been made by the local authorities, it be referred to the Parks Committee to consider whether the Council should acquire the 10 acres for the purpose of an open space.

Sir John Lubbock had never heard it maintained that it was any part of the duty of the Council to house the whole working classes of London, and if not some reason should be shown for erecting buildings on the particular site, and this the Committee did not attempt to show. He entirely sympathised with those who wished to see the dwellings of the working classes improved, but it was important not to discourage the companies, such as Sir Sydney Waterlow's, which had laid out large sums with that object, but which would not continue to do so if they had to compete with the County Council.

Mr. John Burns, M.P., in supporting the recommendation of the Committee, said that in Westminster there was a density of population and an amount of insanitary property as bad as any in the East of London.

Lord Farrer said they were going, out of the rates, to supply artisan's dwellings at a lower cost than the market price, and if they did that they would drive persons like Miss Octavia Hill, who had done so much for the poor, out of the field altogether.

The amendment having been put and lost,

Mr. Beachcroft moved that the houses to be erected on the site be erected subject to the resolution of the Council of March 21, which provided that the rents should be fixed to provide a return of not less than three per cent.

Mr. Bruce seconded, and the amendment was ultimately agreed to, and the recommendation, as amended, was adopted.

Open Spaces for Clerkenwell. The Parks and Open Spaces Committee recommended an expenditure of 10,000l. for the purchase of the two plots of vacant land on the eastern side of Rosebery-avenue to the north of Spa-green, and lying between Lloyd's-row and Kydon-crescent, the purchase money being provided from the amount raised by the Post Office authorities under the Post Office Sites Act, 1891. The Committee were of opinion that these plots, in conjunction with Spa-green, would form an open space in a thickly-populated district, where it would be greatly appreciated. After some discussion this was agreed to.

After transacting other business, the Council adjourned soon after 7 o'clock.

COMPETITIONS.

THE GAMBLE INSTITUTE, ST. HELENS.—The committee appointed to consider the competition designs for the new Gamble Institute, at St. Helens, has just awarded the premiums to the architects of the first three designs. The first premium of 100l. had been awarded to a set of designs by Messrs. Willoughby & Woodhouse, of Manchester. They show a building of four stories, with basement and tower. The main entrance to the public library is under the tower at the corner of Hardshaw-street and Corporation-street, while the main entrance to the technical school is in Hardshaw-street, and near Bicker-staff-street. In the basement there are library stores, plumbers'-room, builders'-room, metallurgical-room, and store-room. On the ground floor there are entrance halls, a general reading-room 89 ft. by 36 ft., ladies' reading-room 36 ft. by 22 ft., boys' reading-room 32 ft. by 23 ft., and reference library and reading-room. On the first floor a physical lecture theatre, physical laboratory, and students' common room are provided. Second floor: cookery kitchen, laundry, elementary art, modelling, and other rooms; and on the third floor there are chemical laboratory and chemical lecture-room. The elevations are to be faced with red stock-brick, with red tan or pink terra-cotta stone dressings, and roofed with green slate, finished at the apex with red Kuabon ridge tiles. The cost will be about 16,000l. Messrs. Briggs & Wolstenholme, of Blackpool, took the second premium of 50l. Mr. George Sedger, of London, was placed third, and was awarded 25l.

ARCHITECTURAL SOCIETIES.

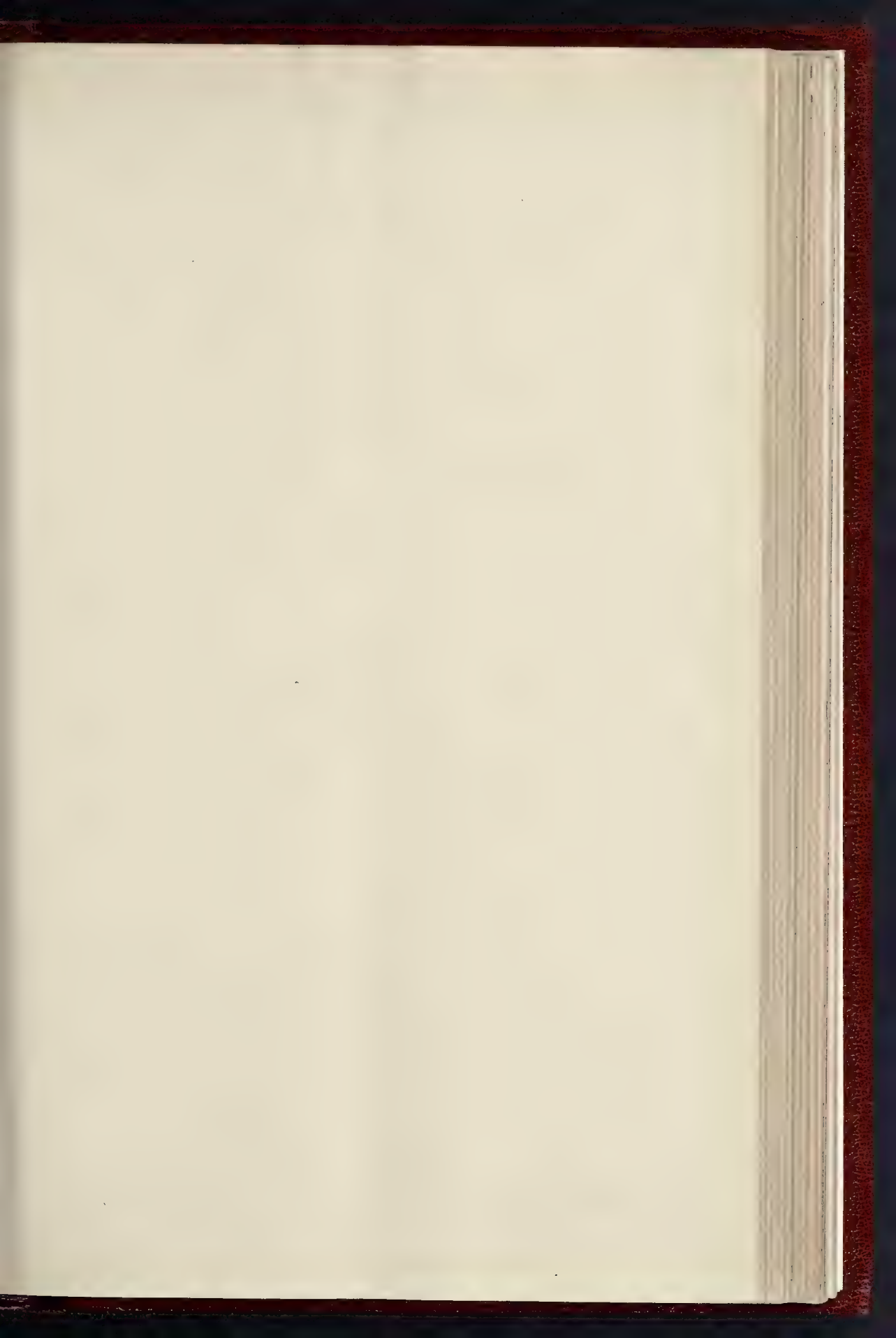
GLASGOW ARCHITECTURAL ASSOCIATION.—A meeting of this Association was held on the 17th inst. in the rooms, West Campbell-street, when Mr. Gilbert Thomson, M.A., C.E., delivered a lecture on "Modern Drainage Arrangements." After referring briefly to the older sanitary appliances and their defects, the lecturer described in detail the methods in use at the present day, and the principles which are now recognised as essential to good sanitation. The ventilation of pipes and sewers was then noticed, and its importance dwelt upon. Proceeding to the more technical points the lecturer referred to the jointing and laying of pipes and the various methods of testing the work. Syphonage of traps was illustrated by means of a model. In concluding it was pointed out that, while progress in sanitary work was always being made, the principles were now pretty well fixed. A vote of thanks to the lecturer terminated the proceedings.

GLASGOW INSTITUTE OF ARCHITECTS.—The annual meeting of the Glasgow Institute of Architects was held on the 17th inst. in the Religious Institution Rooms, Buchanan-street. Mr. W. Forrest-Salmon, the President, occupied the chair. Mr. C. J. Maclean, the secretary, read the annual report, which stated that the roll now contained 50 ordinary and six honorary members. The question of competitions had engaged the Council in several instances, as well as the new building regulations for the city. A Standing Committee on Public Architecture was appointed by the Council, with power to act should occasion arise, but with instructions to report on all matters of delicacy or importance to an early meeting of the Council. This committee thought that it would be desirable that the plans of the two bridges proposed to be erected over the river Clyde should be exhibited in order that the public might have an opportunity of examining the plans. The Council accordingly put themselves in communication with the Police Commissioners, who expressed their willingness to have the drawings exhibited, and remitted to a sub-committee to give effect to that resolution. The exhibition, however, had not yet been held, presumably because it had not been finally decided what was to be done with regard to the proposed bridges. The Chairman, in proposing the adoption of the report, reminded the meeting that it was exactly a quarter of a century since the first annual report of the Institute was read and adopted. The Institute was doing a good and useful work. Their main efforts were to advance the great profession of architecture and to stimulate each other in the direction of high culture and honourable conduct. On the question of competition their labours had been directed

towards assisting those promoting such, but they were satisfied that the best way to secure good buildings was to conserve the architects' talents for the carrying out of buildings. A vast amount of invaluable time had been thrown away on useless competitive drawings. Their efforts, however, together with those of other similar institutes throughout the country, were beginning to tell upon the public mind, and where competitions were determined upon, professional referees were now almost invariably appointed to adjudicate upon the designs. It was even beginning to dawn upon the minds of the youngest architects that to gain public respect they must first respect themselves, and not compete unless the conditions of the competition were such as would ensure fair play. Perhaps the most important work of the Institute during the past year had been the labour and time spent upon the new building regulations for the city. They were looking forward as architects with some hope that ere very long their great and rapidly-growing city would have a model Building Act. At one time it seemed as if the public authorities were afraid that the Institute of Architects was opposed to the improvement of the laws regarding building. It was difficult to understand how such an impression could have been formed; but in whatever way it was formed, it was altogether a mistake. As members of the Institute, their interests all lay in the direction of the improvement and stricter surveillance of buildings. There was no body of men so competent as the Institute to advise with the authorities on the subject of building regulations. The Standing Committee on Public Architecture was established quite recently, and had neither had the time nor the opportunity of accomplishing much. It was hoped that it might prove a useful institution. A very large amount of public money was spent annually on city improvements in which architecture held a prominent place, and this committee in the exercise of its functions might be able to give some assistance as opportunities arose. In conclusion, he referred to the assistance rendered by the Council of the Institute in encouraging and promoting the education of students. —Mr. T. L. Watson seconded the motion, and the report was adopted. Mr. A. Petrie, the treasurer, submitted the financial statement, and, on the motion of Mr. David Thomson, seconded by Mr. J. J. Burnet, the office-bearers were appointed.

PULPIT, PARISH CHURCH, PADDOCK-WOOD.—A carved oak Communion table and a pulpit have lately been placed in the parish church of the village of Paddock-Wood, Kent. They were designed and carried out by Mr. Henry K. Kuchemann, of Bedford Park, Chiswick, W.

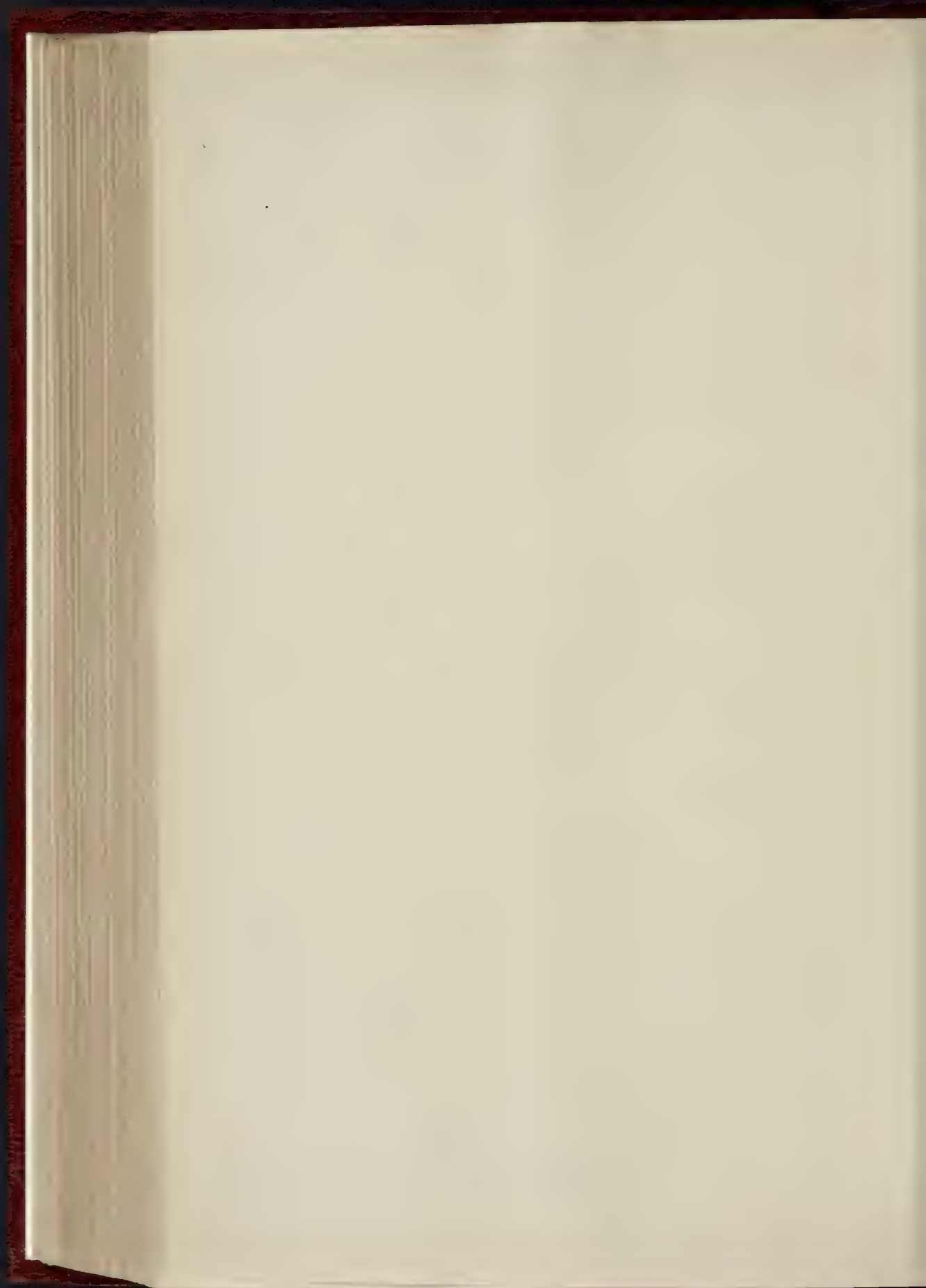
THE LEICESTER SMALL-POX HOSPITAL.—Leicester's difficulties increase rather than diminish. The Sanitary Committee has recommended a site for a new small-pox hospital, and on the project getting wind the opposition with which it has been received both by owners and occupiers is distinguished alike by its vigour and its unanimity. One petition presented against it was 12 ft. long. The fact seems to be that while the people living around Leicester may have no objection to the town's efforts to combat small-pox by isolation minus compulsory vaccination, they are all alike determined that the scene of the interesting experiment shall not be in their particular neighbourhood. In desperation a counter proposal is now made, which simply amounts to this—that the hospital shall be planted down in the middle of the Leicester sewage farm. The sole recommendation here is that the ground already belongs to the Corporation. The spirit in which the matter is being discussed may be judged from the fact that when it was proposed to hear the report of the Medical Officer of Health in criticism of this site, "the Mayor did not think the question ought to be prejudged by special reports." The notion that the report of their official health adviser should not be listened to regarding an important local health question let it stand "prejudice" the discussion, has at least the merit of originality. We are glad to say that the Mayor's objection was overruled. Ultimately, by a considerable majority, it was agreed to ask the Sanitary Committee to report on the practicability of the sewage farm-small-pox hospital proposal. It is a matter so entirely local we do not suppose that the central Government Department would feel justified in refusing a loan, and that is its only controlling function. But if the hospital even does get erected in this ideal site, it will be interesting to watch how the doctrine of the liberty of the subject, understood to be so rampant in Leicester, will be precised by parents who may have a strong sentimental objection to their small-pox-stricken children being treated on the same farm with the town sewage.—*British Medical Journal.*

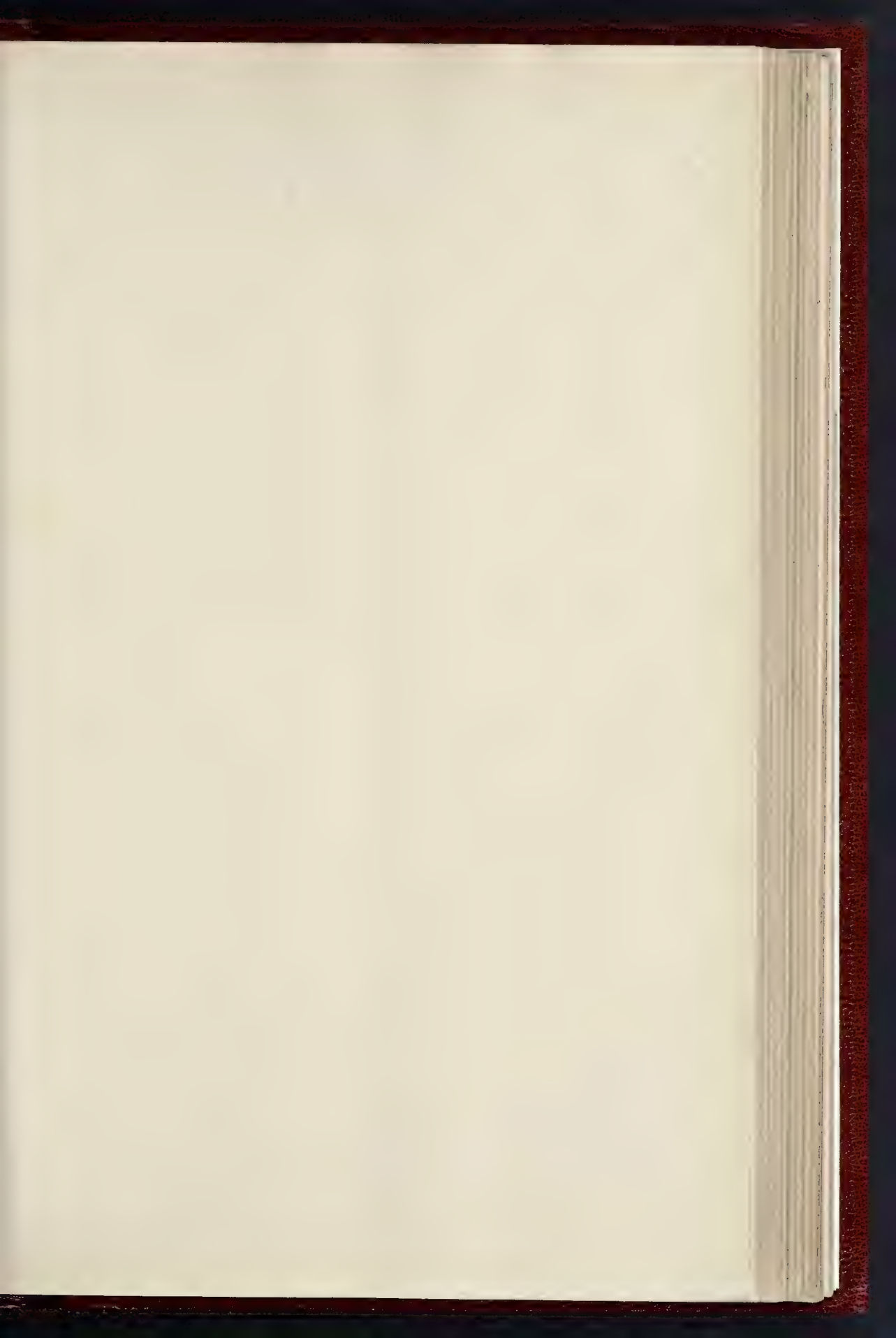




Royal Academy Exhibition, 1893







THE BUILDER, OCTOBER 28, 1893.

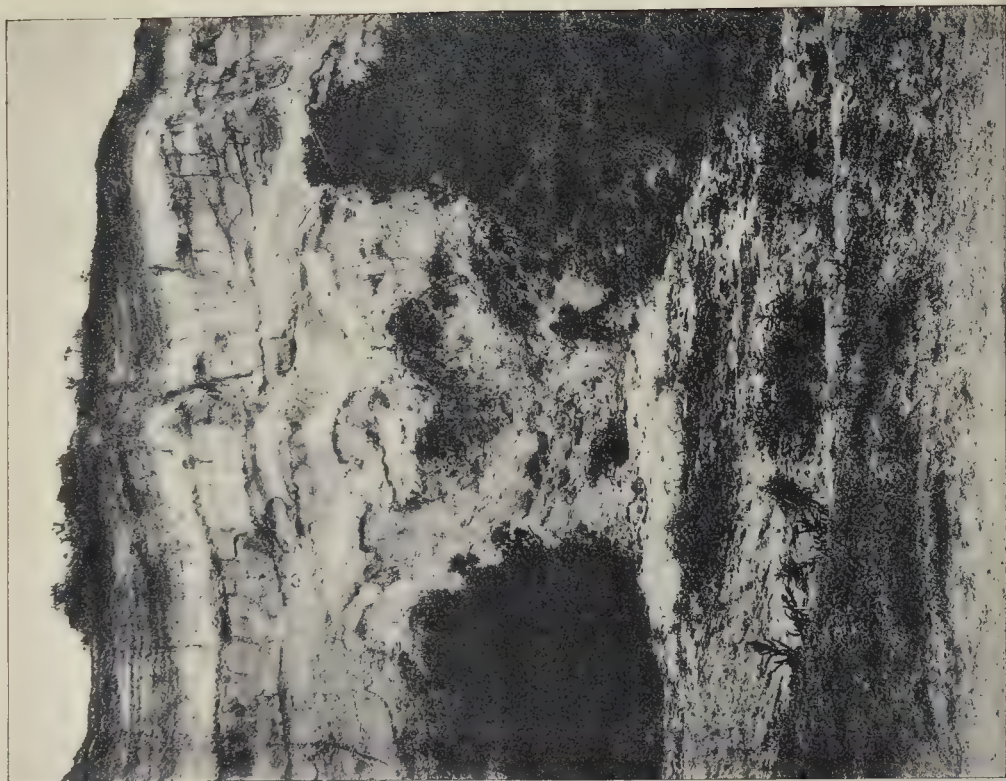


FIG. 1.—SECTION IN QUARRY NEAR AVENING, GLOUCESTERSHIRE.



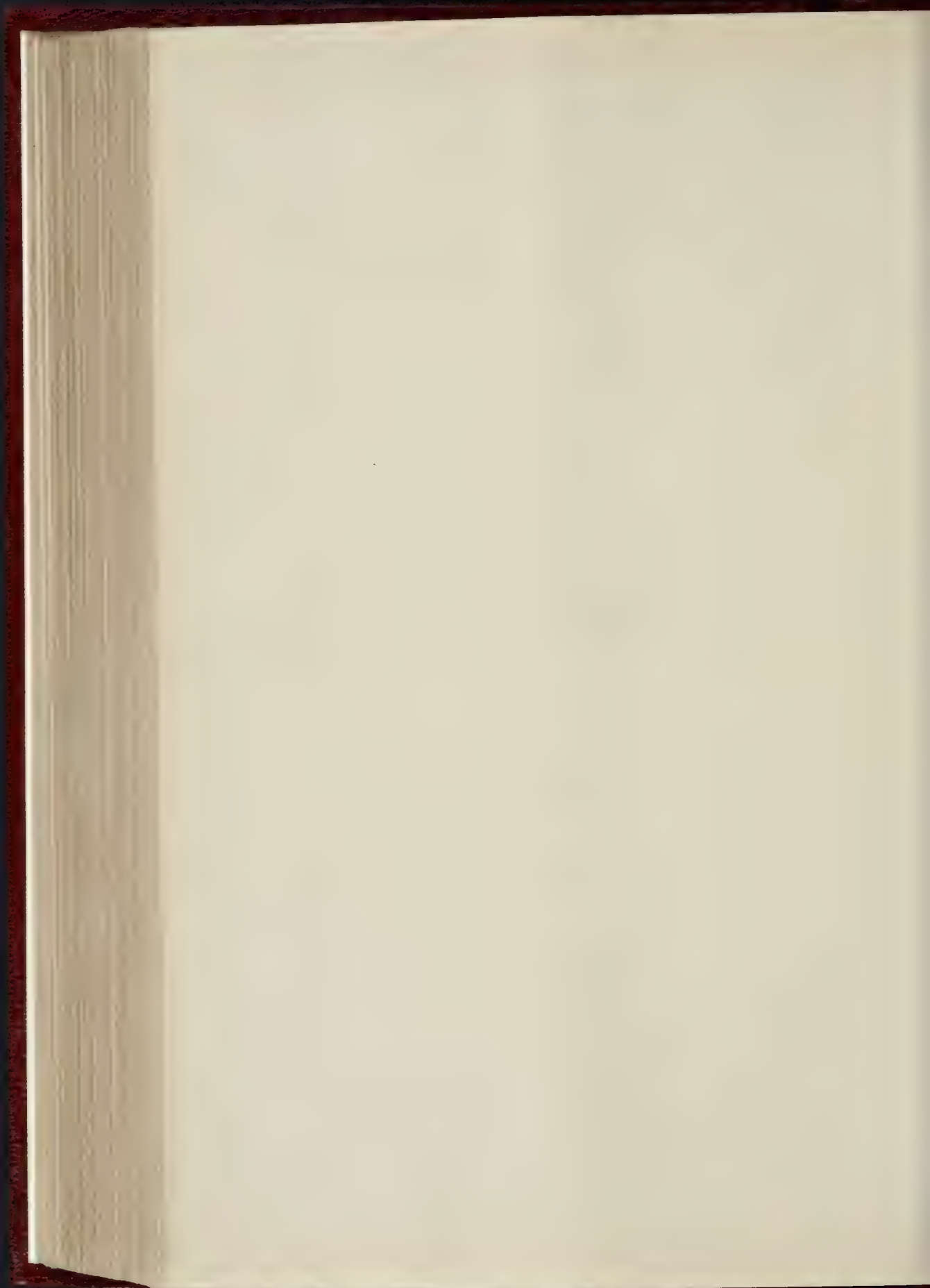
Fig. 3.—FROM TUPLOW HILL, NEAR CATERHAM, SURREY (LOOKING EAST).
Shewing Chalk hills in foreground, on left, and in distance; Upper Greensand undulation, and low-lying lands formed of Gault clay

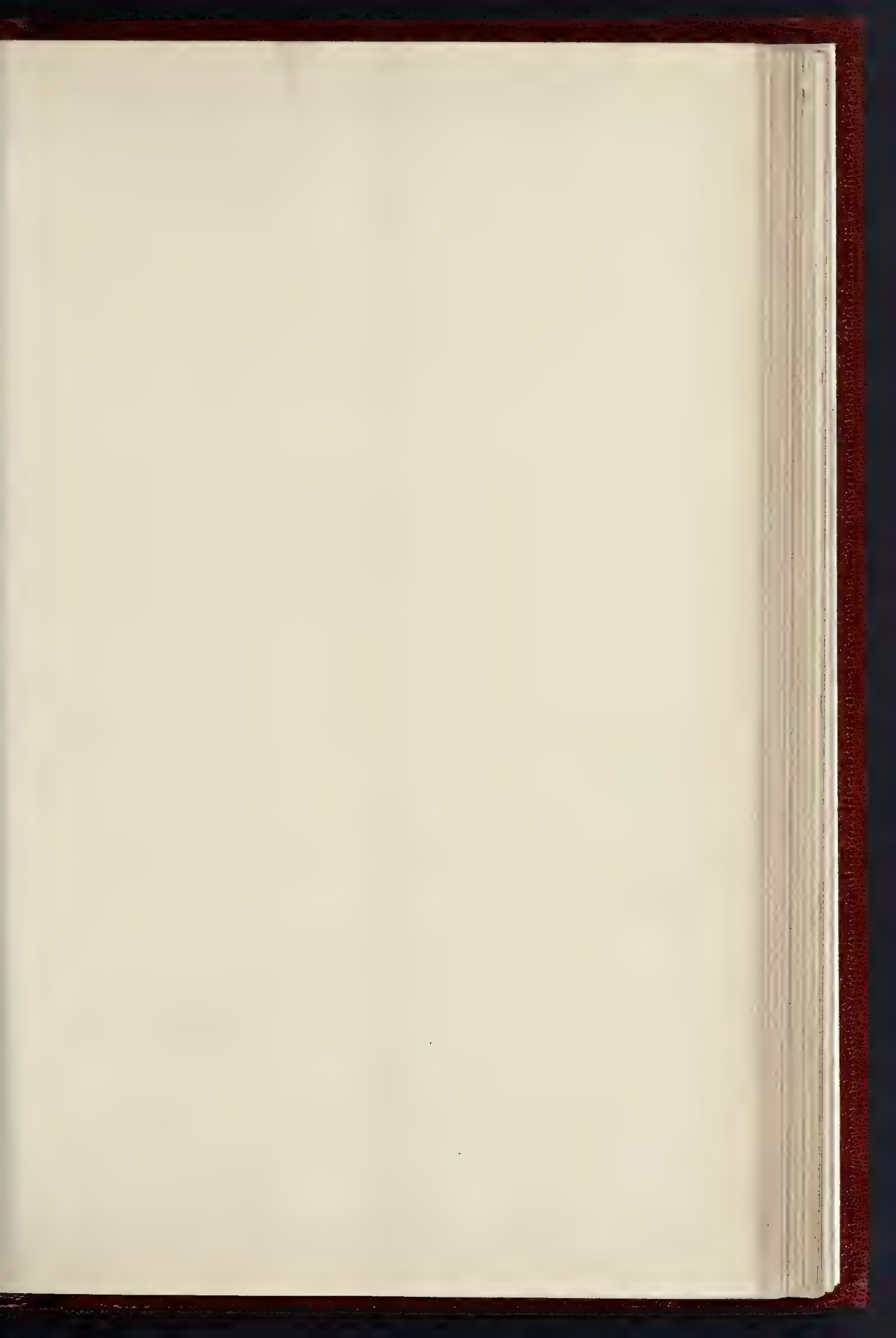


Fig. 4.—FROM SELSLEY HILL, NEAR STROUD, GLOUCESTERSHIRE.
Shewing profile of Rodborough Hill surmounted by a castle. The top of the hill is Inferior Oolite, having a steep slope, under which come the Midford Sands with a lesser slope, then an arch-shaped tract of Upper Lias Clay and Marlstone, the bottom of the valley being Lower Lias Clay



Fig. 5.—SECTION IN CHALK QUARRY, PURLEY, SURREY
Shewing two kinds of Chalk, viz., soft Chalk rubble and Chalk rock

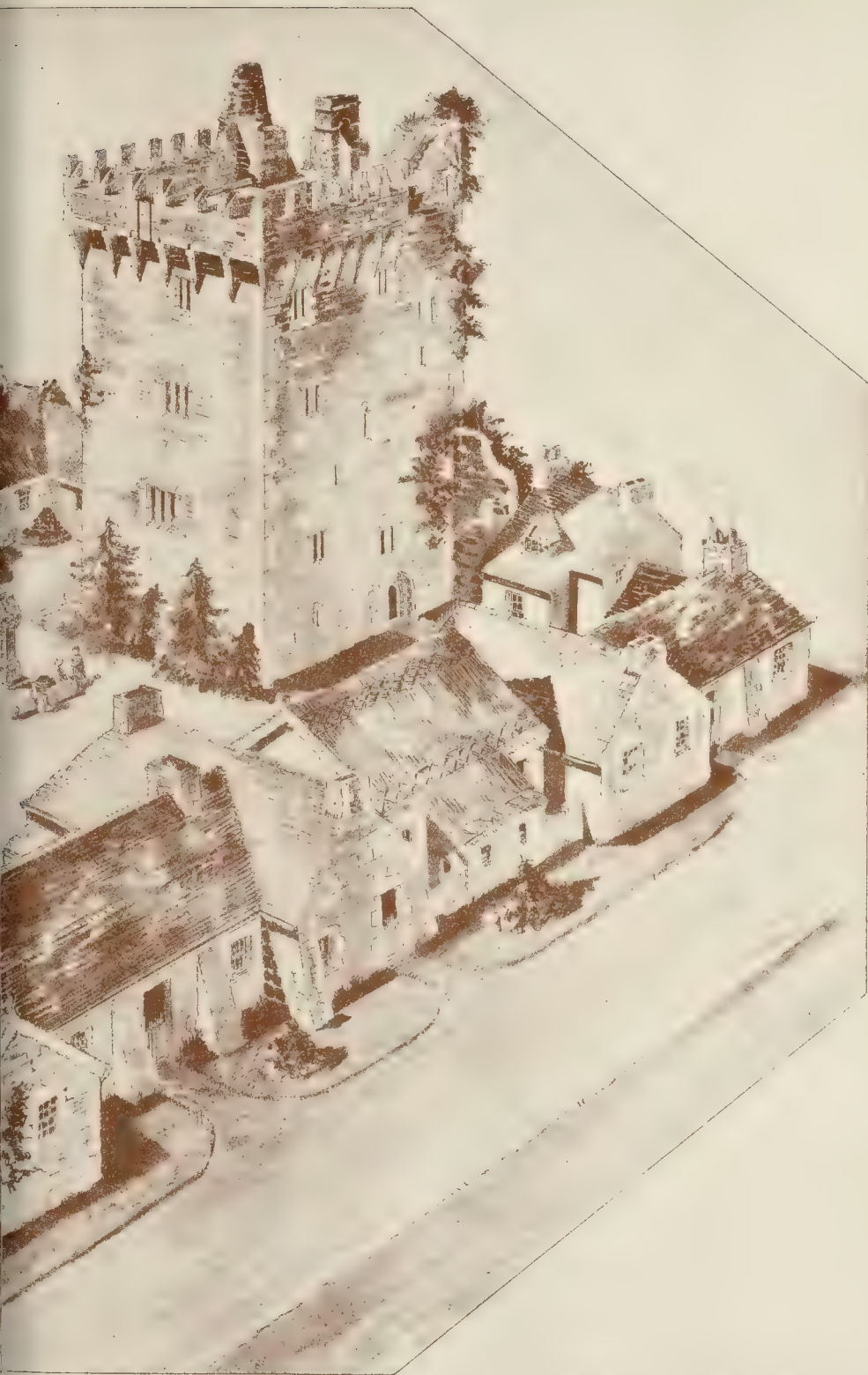




IRISH INDUSTRIAL VILLAGE
WORLD'S FAIR
CHICAGO EXHIBITION '93



IRISH INDUSTRIAL VILLAGE, 1893



WINDY SPRING & CO. 485 FASHIONING STREET FETTER AVE. E

bestows on Renaissance in England, and with some sufficiently typical illustrations from Rochester, Durham, and Canterbury. The subject of Romanesque architecture generally is ably treated by M. Anthyme Saint-Paul, with an unusually large proportion of illustrations. "Rurales (constructions)," or as we should say "Farm-buildings," is treated at some length by Mr. A. Gosset, but the illustrations do not lead one to think that the study of this branch of practical architecture is in a very advanced stage in France.

"Serrurerie Technique" is treated at some length, with a good many practical illustrations, by E. R. (M. Rivoalen?), and "Serrurerie" in the artistic sense by M. Henri Nodet. This latter is a very good and very largely illustrated article, and the illustrations in this case are selected with more impartial regard to variety of nationality than is generally the case in the *Encyclopédie*. "Sociétés d'Architectes" is an article of some interest by M. Ch. Lucas, who has special capabilities for dealing with this subject; it is illustrated with engravings of the seals or medals of various leading architectural societies in the world, among which that of the Institute of British Architects, a product of the period of taste for heraldic medieval devices, is not one of the best, and not good even of its type, though it is certainly better than the bald and commonplace seal of the American Institute of Architects, also we imagine, not a production of very recent date. The best is the medal of the "Société Nationale des Architectes de France," showing an emblematical woman seated among implements of architectural design, with the portico of a temple in the background. The more recent "Société Centrale" also employs on its medal the device of a classic figure emblematical of architecture, treated in a decorative manner, and seated between conventional and natural sprays of vegetation; the natural spray might have been spared, and does not add to the decorative effect and significance of the whole. The seal of the "Caisse de Défense Mutuelle," a female head of Greek type, in profile, crowned with a castle, is a good design in a more severe style.

M. Lucas also treats the subject "Stèle," a type of monumental erection which has appeared specially to French taste, and has been very largely used in modern monuments; an example of this use is given in an engraving of the stèle erected to the memory of Constant-Dufeux.

The important subject of "Style," as an abstract quality in architecture, is treated at some length by M. Léon Labrousse. He regards Ruskin and Semper as the two writers who have in modern times made the most important contribution to the critical and philosophical consideration of style. We should hardly regard Ruskin as a clear or definite writer on style; Semper was, though he had the usual fault of the æsthetic theorist, of being too sure of everything. M. Labrousse warns his readers against the misconception (a very common one) which leads people to confound style with fashion (*mode*). The article concludes with an analysis or summary of the qualities which go to make style, which comes sufficiently near the mark, but we confess that we hardly think precise definition possible. The "Styles Français" are historically treated by M. Rivoalen at considerable length and with a profusion of illustrations giving examples of the differences of detail and ornament in the succeeding Renaissance styles or fashions of France (for we should be inclined to say that Louis Quatorze, Louis Quinze, and Louis Seize are modifications of the same style according to different fashions). The successive styles of other countries, and their modifications, are we suppose of no consequence in comparison with those of France, as they are left out of account altogether.

The subject "Théâtre" is treated by M. Gosset in a very practical spirit, with a good many plans of various theatres. M. Gosset not unnaturally contrasts our Covent Garden house with the Paris Opera to the great advantage of the latter, as he has every right to do; but in regard to smaller theatres he seems entirely ignorant of the recent great improvements in the sanitary and fireproof construction and arrangement of theatres in this country, and of the excellent examples of these qualities to be found in some recent London theatres, from which French theatre architects might learn something. An article on Versailles by M. Rivoalen is a useful concise history of the celebrated Palace, with illustrations showing it at different stages of its development.

We are glad to record the completion of what certainly is a very interesting and valuable publication, full of illustrations and information

of various kinds, and one which every architect may be glad to have on his shelves. At the same time we must repeat that its value is considerably impaired by the fact that the majority of the subjects are treated from an entirely French point of view—that the book is, in fact, emphatically a Frenchman's *Encyclopédie* of architecture: a title which implies both many excellences and many limitations.

Electric Lighting and Power Distribution.

Parts II. and III. By W. PERREN MAYCOCK, M.I.E.E. London: Whittaker & Co. 1893. We noticed Part I. of this treatise, published towards the end of 1892, last January. Parts II. and III., though published at an interval of some months, reached us nearly at the same time, and it will be convenient to consider them together. Part II. opens with chap. vii., in which no less than seventeen direct current dynamos are described in forty-two pages, nearly half of which space is occupied with illustrations and diagrams. It is, of course, impossible that they should receive anything like adequate treatment in this space; the two open-coil arc machines, the Brush and the Thomson-Houston, fare best, and the regulating gear for the Statter constant current dynamo is pretty fully described. The student is mercifully warned not to "read straight through this chapter," but "to refer particularly only to those machines that are brought under his notice"; but we think it would have been much more useful had Mr. Maycock selected only one or two typical machines and described them in detail, leading his readers, as far as may be, along the lines of thought of the inventors, and pointing out the reason of each variation or peculiarity in the design. It is singular, too, to find fast and loose pulleys and striking gear described as if they were peculiar to the Statter dynamo. Of course, Mr. Maycock knows that this device is far older than any dynamo, but the way the matter is put might deceive a student innocent of all previous knowledge of mechanism.

In the next chapter alternators are similarly dealt with. The space given to each machine is about the same, but owing to the greater simplicity of this class, the treatment is more adequate.

Then follows a chapter on motors, very elementary and very clear, as befits an introductory manual; after which there is an equally satisfactory chapter on the characteristic curve. We must demur, however, to Mr. Maycock's definition—"A characteristic curve may be defined as a diagram in which a curved or straight line is employed to represent the relation of certain varying values to each other." This surely is far too wide a definition. The term, though occasionally used for the curve giving the relation between induction and magnetising force, should only be employed for the curve connecting the E. M. F. and current of a dynamo.

A good chapter on lamps and systems of distribution completes the volume.

Vol. III. opens with electrolysis, and here we find once more the loose statement that "as water itself is comparatively a bad conductor, it is necessary to slightly acidulate it with a few drops of acid." If this were the only function of the acid, it would matter little what acid were used. We much prefer to regard the acid itself as the electrolyte, the oxygen at the anode being obtained by the decomposition of the water effected by the anion of the acid.

Perhaps we may be here allowed a protest against Mr. Maycock's invention "*Kathion*." "*Kation* we know and *cation* we know, but what is this *Kathion* but a monstrosity born of ignorance of Greek?

Perhaps it is hardly fair, however, to expect an author to know Greek when he has hardly mastered his own tongue, and there are in these volumes several instances of defective English. Thus, on page 212, we find it stated that the least active coils are "parallel with themselves," on page 217 "ensure" is used in the sense of prevent, and on page 306 we have the singularly ungrammatical sentence, "such a lamp obviously does not need replenishing with carbons so often as an ordinary, or single carbon lamp, such as are (*sic*) shown in Figs. 202, 203A, &c.," while on the next page we find magnetise used as a neuter verb.

The few pages on electrolysis introduce the subject of secondary batteries, which are very well, though briefly, treated. After this we come to chapters on transformers, on systems of supply, and on switches and other accessories, in which the author has contrived to convey a great deal of

useful information in a very limited space. Chapter XVI. on "Electrical Measurements and Calculations" contains a number of very easy numerical questions fully worked out, and will, no doubt, be useful to students. At the end of each chapter there is an examination paper on its subject matter, and the book closes with a brief sketch of the most recent advances, and indicates the directions in which further advance may be expected. An index, and a few blank pages for notes, completes a treatise which, though singularly unequal in merit, is, on the whole, well adapted to its purpose as an elementary manual for candidates for examination.

An Attempt to Recover the First Design of the West Front of the Abbey Church of St. Peter, new Peterborough Cathedral. By JAS. THOMAS IRVINE. Published for the Author by C. Edwards; Peterborough: 1893.

This is a reprint of a paper read by Mr. Irvine, the well-known clerk of works at Peterborough Cathedral (and previously at many other cathedrals when Sir Gilbert Scott had them in hand), who knows every stone of the building. The subject is not the projected west front of the Transitional builders which was hastily abandoned shortly after commencement, in order to build the existing one, but the variations between the upper part (mainly) of the existing front and the original intention of its designer. The conclusions are entirely drawn from the examination of the existing building and the evidence furnished by discrepancies in the stone work. The paper is a very interesting one, valuable as a record of facts, and probable in regard to the deductions made from the facts. We cannot agree with Mr. Irvine, however, in thinking the late west porch stuck in the central arch of the great portico in any way an improvement to the appearance of the front. On the contrary, we think it is an excrescence on a grand design, though it is no doubt a remarkable example of cleverness in turning a practical necessity into what is in itself a pleasing architectural feature, but entirely out of scale and harmony with the main design of the west front, and consequently spoiling it.

Correspondence.

To the Editor of THE BUILDER.

NEW BYE-LAWS FOR LONDON.

SIR,—Under the Public Health (London) Act, 1891, the London County Council have promulgated bye-laws which have been "allowed by the Local Government Board" on June 28 last, and are now in force.

These bye-laws (published in a paper, No. 104, price 3d. Sold by Steel & Jones, Spring-Gardens, S.W.) are such as should be provided for in the preparation of plans and specifications, and the attention of architects has not, so far as I am aware, been specially directed to them.

In the bye-laws there will be found numerous important regulations affecting buildings—whether constructed before or after the passing of the Act—as to the closing and filling up of cesspools and privies, as to the construction of water-closets, earth-closets, privies, ashpits, cesspools, &c., and the proper accessories thereto.

It is provided that every sanitary authority shall enforce the bye-laws, and any directions given by the said authority shall be in accordance with the bye-laws, and so far as they are not in accordance shall be void; from this it will be observed that we have the distinct advantage of uniformity in these matters throughout the Administrative County of London.

THOMAS HENRY WATSON.

THE INSTITUTE EXAMINATIONS.

SIR,—Mr. Mountford, in his Presidential address to the Architectural Association, when commenting on the manner in which "Design" is dealt with in the Examination, appears to have overlooked the important change which will be made when the new "Final Examination" comes into operation in 1895.

The "Time Table" of the Programme of this Examination was printed in the *Journal of Proceedings*, R.I.B.A., Vol. ix., No. 17, June 22, 1893, p. 418. The arrangements set out therein provide that the subject "Design" shall be the first taken, when the candidate's mind is fresh and unwearied, and the times are—

"Friday, 10 to 6: Design of a building of

moderate dimensions, or a portion of a more important edifice, to be made from particulars given, &c. Saturday, 10 to 4: The constructional and artistic details of the design made on Friday."

The subject having been communicated to the candidate in general terms at the same time as his admission to the Examination.

It cannot be expected that any Programme of the Examination will satisfy all its critics, but the change which will be established by the new Programme will certainly be a great improvement on the system it will supersede.

ARTHUR CATES.

Chairman of the Board of Examiners, R.I.B.A.
7, Whitehall Yard, S.W., Oct. 25, 1893.

PROPOSED BUILDING EXHIBITION IN 1894.

SIR,—Some weeks back you very kindly inserted a letter from me on the importance of holding in 1894 a Building Exhibition upon a wise and comprehensive scale.

Permit me now to say that the views I then ventured to suggest have been acted upon, and that the promoters have already secured the co-operation of leading gentlemen, whose names will be published shortly, constituting a consultative committee.

The object of this committee is to classify all exhibits in such a way as shall make the Exhibition interesting and profitable.

It has been suggested that the exhibits shall be in strict sequence, *i.e.*, on entering the building, everything that pertains to foundation work, including pipes and sanitary arrangements in the basement, shall be the first feature. Following this, exhibits connected with the superstructure, bricks, stone, marble, timbers, timbering, joinery, concluding with roofing, slates, tiles, ridges, finials, &c. Following the structural features will be all kinds of decorative work, metal and wood, tile and other features for internal work.

Under the galleries, and in other suitable parts, it is proposed there shall be working machinery illustrating how joinery work is now perfected, encaustic and other tiles pressed, with a thousand-and-one labour-saving appliances now so largely adopted.

Should any of your readers be disposed to co-operate, Mr. W. R. Larkins, of the National Building Exhibition Company, 28, Martin's Lane, Cannon-street, E.C., will be most pleased to hear from them, and to carry out any suggestions that may be valuable.

T. FREEMAN.

WHAT IS A PUBLIC SEWER?

SIR,—By your permission I should like to ascertain the opinion of your readers as to the correct reading of the Sanitary Act of 1890, respecting the drainage of one or more houses of a terrace into the public sewer of a street. The Public Health Act, 1890, sec. 19, states, "That where a nuisance or complaint exists the local authorities can compel the owners to abate the nuisance; if they do not do so the sanitary authority can do the work and charge it to the owner or owners as a private improvement." This is an extension of the Public Health Act of 1875. Sec. 19, 1890, says, "For the purpose of this section the expression drain includes a drain used for more than one building." I live in an urban district where the clerk and chairman of the Local Board of Health have pronounced that a drain that connects to more than one house is a public sewer, and repairable as such by the sanitary authorities at the *ratepayers'* expense; they go farther, and say that in addition to the syphon that disconnects the main sewer from the houses it is necessary to have a syphon and air-shaft to each cottage or house; this, to me, is spoiling the drains or sanitation with a vengeance. Some of your readers, perhaps, might be kind enough to enlighten me on this subject, or how the Act is enforced in their locality; or possibly some one may know if any decision has been given in any law courts as to the definition of a public sewer.

C. H. A.

OAK REREDOS FOR A MORNING CHAPEL IN JAPAN.—On the 13th inst., prior to a service held in the Lady Chapel at Exeter Cathedral by the Guild of St. Paul, a presentation was made by the members of the Exeter Branch of the Guild to the Bishop. The present assumes the form of a carved oak reredos designed for the Bishop's morning chapel at Sakio-Cho-Shiba-Tokyo, Japan. The super-altar is supported by ornamental brackets, and above is the reredos proper, divided into three compartments, the central one higher than the flanking ones, and gabled in the middle, and in the midst of a vesica, formed of conventional clouds, is the rising figure of Christ in the act of ascension. The right hand is raised in Benediction. In recessed and carved panels at each side are angels in attitudes of adoration. The framed work is carved with running ornament of fifteenth-century West-country character, and the sides abutting the central gable have cornices of lace-like carving. The work has been carried out by Messrs. Harry Hems & Sons, of Exeter.

The Student's Column.

GEOLOGY.—XVIII.

SCENERY AND GEOLOGICAL STRUCTURE.

THE field geologist in constructing a geological map takes advantage of every surface feature to assist him in his work. If, in going over a flat country, he comes across an inequality in the ground, he at once feels it incumbent on him to inquire into the cause of the same—a characteristic undulation, a low range of hills, a dome-shaped boss rising out of the plain, a terrace-like series of steps, each has some geological meaning, in most instances indicating a change from one class of rock to another. A little experience shows him moreover that each kind of material on weathering produces a marked contour of an unmistakable character. A soft limestone exhibits a totally different outline to a hard one, and both are clearly distinguishable in that respect from sandstone or slate. It is not to be expected, in the nature of things, that soft clay or sand can produce such bold features as a compact crystalline material, or that a rock full of regular joints and cleavage planes will present many features in common with, say, an irregularly-jointed granite. We all know that the character of soil very

going observations, drawing upon tracts of country near home to furnish the material. We will first go to Caterham in Surrey, which place is situated on the Chalk formation. In that district we find there are at least two very different kinds of Chalk, as shown in fig. 5 (lithograph plates). The upper half of this pit may be described as a soft, rubble-like, earthy limestone devoid of anything like regular jointing; the lower part is a comparatively hard earthy limestone, with a more or less regular system of jointing and bedding, breaking up into large cubical fragments and blocks. The junction between the two beds is well shown in the illustration. We cannot pause here to explain the origin, or in what way such influences structure in the same class of rock influences certain fundamental questions relating to water-supply; but the student will readily understand that the two beds must weather differently. Attention may, however, be called to the existence of a "pipe," indicated by a dark patch in the upper portion of the section, a little to the right of the centre of the illustration. The "pipe" in this case is filled with ferruginous earth and gravel which have fallen into what was once a hole in the Chalk.

Taking now the road from Caterham towards Godstone we enter on the confines of the map delineated in fig. 6. Arriving from the north, we



Fig. 6.—Geological Map of the neighbourhood of Godstone, Surrey.

a.—Chalk. d.—Lower Greensand: Folkestone beds. g.—Lower Greensand: Atherfield beds.
b.—Upper Greensand. e.—" " Sandgate beds. h.—Weald Clay.
c.—Gault Clay. f.—" " Hythe beds.

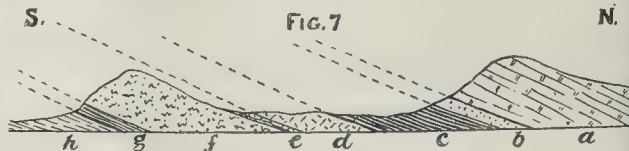


Fig. 7.—Section across fig. 6 along the road from Caterham to Tilburstow Hill.

largely determines the nature of the vegetation growing upon it; thus fir-trees grow luxuriantly on a sandy soil, oak-trees on firm clay-land, and so forth. When natural sections fail him, the field geologist can frequently arrive at the approximate nature of a deposit by closely observing the species of trees growing on it. It must be understood, however, that vegetation is not always to be relied upon as indicating the character of "solid" rocks, as these latter may be, and often are, partially masked by superficial deposits in which trees take root.

Let us endeavour to illustrate some of the fore-

ascend a gentle slope, until we stand on the summit of the Chalk (a) escarpment—the North Downs—passing some clumps of trees by the way which denote the presence of drift-gravel, &c. lying on the Chalk. From this elevation a fine view southwards is disclosed, looking over a broad valley towards another range of hills, composed of the Hythe beds (f) of the Lower Greensand clothed with trees as far as the eye can reach. Still standing at the top of the Chalk ridge, far from the point marked "quarry" on the map, we cast our eyes eastwards along the southern flank of the escarpment, and observe the

view represented in fig. 3, on the lithograph plate.

Chalk hills are remarkably destitute of vegetation in almost any situation, the only clothing they possess being short, stunted grass an inch or so in height, and occasionally a few bushes dotted here and there. The illustration given, however (fig. 3), forms rather an exception to this rule; it has been selected to show as many features as possible in a limited space. Here the student will recognise the steep Chalk slopes in the foreground, to the right, and in the distance. He will perceive that in some places the Chalk is only covered with short grass, being comparatively bare, whilst in others, well-wooded coppices, &c., make their appearance. It would not be very difficult in such a district to define the limits of the superficial patches of sand, gravel, and clay forming the drift, as they are approximately indicated by the situations of the trees. A characteristic feature of Chalk hills (not seen in our illustration by reason of the view having been taken along the flank of the escarpment instead of in front of it) is the formation of hollows, combs, or "punch-bowls" on their steep, arch-shaped slopes. On looking at a Chalk escarpment from a distance, one often sees a number of these hollows, one after the other, along the line of hills.

Reverting to fig. 3, which the student is desired to carefully compare with figs. 6 and 7 whilst reading these remarks, we may call attention to the very different style of surface configuration after descending the Chalk hills. We now find ourselves on a flat or slightly undulating tract of country, clearly shown in the illustration. The reason for this sudden change is not far to seek. Chalk, although by no means a durable rock, withstands the action of the weather much better than does soft clay, and if the student has followed the section (fig. 7) up to this point he will see that the low-lying land (after passing a slight undulation caused by the Upper Greensand) is composed of Gault clay, which has given way to denudation much more readily than the Chalk. Continuing our walk southwards over this damp, earthy plain, with its fine trees, we come across some rising ground denoting a change in the nature of the rock, and on the right-hand side of the road observe a large sand-pit in the Folkestone beds. This sand is beautifully clean and crystalline, and is actively worked. Passing through the picturesque village of Godstone, and over the loamy Sandgate beds, we arrive in a well-wooded country, and noting that the trees are mostly firs, conclude, therefore, that the subsoil is sand. The road now begins to ascend the side of a steep hill, near the summit of which we find ourselves facing the sand-pit in the Hythe beds (f), illustrated in fig. 2 on the plate. We may profitably pause for a moment to examine some peculiar structures found herein, which have mainly been instrumental in assisting the loose material to resist the "agents of denudation." We see slabs of chocolate- and orange-coloured material, as well as twisted pieces lying about the floor of the pit. On looking at the section we note that the sand itself is of an orange-yellow tint, and by scaling the precipitous face, trace the slabs to their original position *in situ*, and discover that they formed parts of irregularly-disposed "pans," represented by the tortuous lines near the centre and top right-hand corner of our illustration. These chocolate-coloured slabs have much interest to the architect, for the substance of which they are composed is the iron of the ancient Weald furnaces, out of which the gates of many edifices in London and elsewhere were forged in olden times.

Leaving the sand-pit and the road, we now ascend the steep, bushy slopes and gain the top of Tilburstow Hill, on the escarpment of the Lower Greensand. To the south a splendid panorama is laid at our feet: the eye traces a flat, low-lying country with a ridge springing out of it some miles away, and lines of blue hills are discerned in the far distance, through a gap in which on a clear day the waters of the English Channel sparkle.

The following sketch section, fig. 8, gives some idea of the structure of the ground seen south of

Tilburstow Hill where we now stand, from which it is observed that the low-lying land referred to as, usual, clay—Wealden Beds. The ridge rising like an island some distance off is a member of the Hastings Sand, harder than the sea of clay surrounding it, and stands boldly out to proclaim the fact. The lines of blue hills seen are the escarpments of the Lower Greensand and Chalk respectively, the latter known as the South Downs. These are clearly indicated in the diagram, towards the south. Thus the ground between London and Brighton may be described as a denuded anticline—the "Anticline of the Weald." The dotted lines restore the arch, partially, before denudation, though, owing to the vertical and horizontal scales of the diagram not being, of necessity, alike, the arch is disproportionately heightened. The student will see from this illustration how great and widespread are the geological effects of meteorological action, and get some idea of the enormous mass of material removed in the process and laid down elsewhere.

On traversing the district just described, the architectural student will observe many other points of interest. He should particularly note the divers angles of rest, so to speak, of the different formations and their varying degrees of porosity. At the base of the Chalk escarpment north of Godstone are several large underground quarries producing an excellent fire-stone, and the methods of getting the material are worthy of study. In these quarries also he will, under guidance, derive some information on matters connected with water-supply; the rise and fall of the water has been carefully noted from time to time, and marks recording the same are found on the sides of the galleries. On the Gault, near by, is an old brickyard, and sand-pits in the vicinity have been already alluded to. In short, we know of no other district near London where so much, geologically, may be seen in the course of a single day, and it is of especial interest to the architect as showing the influence of geological structure on scenery.

Coming now to a different class of scenery, we will ask the student to accompany us to the delightful valleys carved out of Jurassic rocks in the neighbourhood of Stroud. Here the great Oolite and Inferior Oolite, yielding good building stone, especially on Minchinhampton Common and on the road from Nailsworth to Avening, have been scored by denudation and eaten into down to the impervious Lower Lias, the hill-slopes sustaining an abundant and varied vegetation. The effects of weathering can be studied at several points, but nowhere, perhaps, better than in an opening in Great Oolite, near Avening, on the Tetbury-road, known as Essex's quarry, or "Picked-piece." One face of this working is represented on our plate (fig. 1). It will be observed that the stone varies much in regard to its jointing and bedding. The latter is such that the top of the quarry is weathered into tile-like rubble, which in descending order insensibly passes to thicker bedded strata, and at the bottom of the section into beds of building stone, 2 ft. or more in depth. It is characteristic of many Oolites that in weathering they split into thin beds (sometimes used for roofing purposes) near the surface, and pass upwards from this into soil. In order to judge of the nature of the material for building purposes, therefore, it is necessary to dig deeply into the rock before the solid beds are found. We do not say that this is always the case, but it is very frequently so. The figure also illustrates false-bedding cutting the actual bedding planes at a low angle, a common feature with Oolites in the vicinity of Stroud.

The process of denudation of such materials is a very simple one; having reduced the solid rock to rubble, the latter in course of time becomes thoroughly decomposed, and is easily removed in chemical solution and by the mechanical action of rain. At the same time the material is harder than some other rocks in the neighbourhood, and its angle of weathering is a rather high one. This is exemplified in the view on the plate, fig. 4, by the high hill crowned by the "fort." The summit

of this eminence, and for some distance down its steep slopes, is Inferior Oolite. On looking at the profile it will be seen that this rather high angle becomes slightly lower, a circumstance due to the difference in weathering imparted by the bed next below—the Midford or Cotteswold Sands. The Upper Lias and Marlstone below this cause another slight variation in the slope; until on arriving at the bottom of the hill we find a flat plain of impervious Lower Lias Clay. Rodborough Hill, as the height just alluded to is called, exhibits typical weathering of the Jurassic series; but equally good examples may be found in the vicinity—at Selsey Hill, for example, from whence the photograph forming our illustration was taken. The hills in the distance are likewise of Jurassic age.

OBITUARY.

MR. GEORGE LANDSOWN.—The death is announced of Mr. George Landsown, of Warwick-street, Charing-Cross, and 67, New Kent-road, S.E., architect and surveyor, in his 60th year. Deceased, who was District Surveyor of East Newington, and part of St. George-the-Martyr, Southwark, for nearly nineteen years, was the son of the late James Landsown, who was eminent as an architect, and was associated with the late Decimus Burton in many important works. At the present time, when the merits and demerits of the new corridor-trains are being largely canvassed, it is curious to note that the first patent for this idea was granted to Mr. George Landsown as far back as 1864, when, however, owing to the opposition of the railway companies, the patent was allowed to lapse. Mr. Landsown reaping no material benefit whatever therefrom.

MR. W. A. COLLS.—We have to record the death of Mr. William Abraham Colls, of the firm of Messrs. Colls & Sons, builders, Coleman-street, which took place, after a few days' illness, at his residence, Homedale, The Avenue, Gipsy Hill. The deceased, who was fifty-one years of age, was the eldest son of the late Mr. Benjamin Colls, founder of the firm. He was this year's President of the Builders' Clerks' Benevolent Institution, a member of the Institute of Builders, and of the Master Builders' Association.

ALDERMAN CAIL.—The death is announced of Alderman Cail, a well-known contractor of Newcastle. The Alderman was in his eighty-second year, and had been a member of the Corporation from 1866. Among other works, he constructed the North-Eastern line from North Shields to Tynemouth, involving the building of a tunnel under the town; the Bishop Auckland branch line and the Deerness Ferry branch; he made the Nidd Valley and Rosedale branch lines, and executed several contracts for the Yorkshire mines. He built the Berwick Bridge over the Tweed, and was concerned in various large undertakings.

MR. JAMES HILL.—We regret to hear, just as we are going to press, of the death of Mr. James Hill, the senior partner of the firm of James Hill & Co., of 100A, Queen Victoria-street, E.C.

GENERAL BUILDING NEWS.

CONSECRATION OF A CHURCH, BLAENAVON, MONMOUTHSHIRE.—On the 10th inst. the Church of St. Paul's, Blaenavon, was consecrated by the Bishop of Landaff. The church will accommodate about 300 persons. The architect is Mr. E. A. Lansdowne, of Newport, and the builder is Mr. John Burgoyne, of Blaenavon. The total cost of the church will be about 2,000l.

MASONIC LODGE FOR PONTEFRAC.—Contracts have just been let for the erection of Masonic Lodge buildings in Ropergate, Pontefract. The buildings are to be built of brick, with terra-cotta panels and stone facings. On the upper story will be a lodge-room, 34 ft. by 21 ft., with ante-rooms adjoining, and downstairs will be a dining-hall, 51 ft. by 21 ft., which may be also used for a ball-room, and will be fitted with movable partitions to make it into three small rooms for other purposes. A caretaker's house will be attached. Mr. J. H. Greaves, of Pontefract, is the architect. The cost will be 1,000l.

PROPOSED PUBLIC BATHS, WALSALL.—On the 14th inst. an inquiry was held at the Council Chamber, Walsall, by Mr. K. Walton, C.E., as to the application of the Walsall Town Council for power to borrow 12,380l. for building public baths in Lichfield-street. The Town Clerk, Mr. J. K. Cooper, laid before the Inspector the statistics as to the borough, showing a population of 71,789 at the last census, 13,000 houses, and a rateable value of 146,155l. The sum to be borrowed included 9,000l. for the building. The Council had had twenty-five sets of plans sent in for the baths, and had selected those of Mr. Bonner, Chancery-lane, London. The building would provide two swimming-baths, 80 ft. by 30 ft., with forty dressing-boxes, and 60 ft. by 25 ft. with thirty-four dressing-boxes. There would be four first-class men's slipper-baths and eighteen second-class, and two first-class women's and nine second-class, besides a set of Turkish baths. Afterwards Mr. R. H. Middleton (the Borough Surveyor) and Mr. Bonner (the architect)

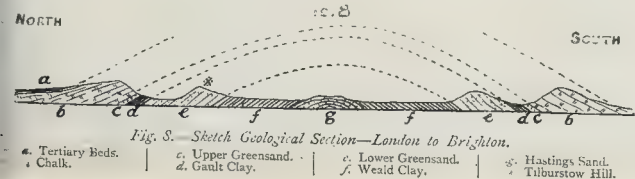


Fig. 8. Sketch Geological Section—London to Brighton.

a. Tertiary Beds. c. Upper Greensand. e. Lower Greensand. g. Hastings Sand.
b. Chalk. d. Gault Clay. f. Weald Clay. h. Tilburstow Hill.

gave evidence as to dimensions, drains, ventilation, water supply, and other matters. Subsequently the Inspector visited the site of the proposed baths.

CHURCH, FLEUR-DE-LIS, MONMOUTHSHIRE.—On the 11th inst. the Bishop of Llandaff laid the foundation-stone of a new church, to be dedicated to St. Lewis, at Fleur-de-Lis. The church is being built on a site given by Lord Tredegar. It will accommodate over 350 persons. Mr. E. M. Bruce-Vaughan, of Cardiff, is the architect, Messrs. T. Williams & Son, of Cwmdu, Newbridge, Mon., builders, having been entrusted with the contract. This church is estimated to cost £3,340.

NEW CHURCH, PRESTON.—On the 10th inst. Dr. Moorhouse, Bishop of Manchester, consecrated the new church of St. Jude, which has just been erected in St. Paul's-road, Preston. The building has been built at a cost of over £6,000, including the site, and has seating capacity for 800. The new church in plan consists of a wide nave with side aisles and transepts; a large chancel and north and south chancel aisles. The baptistry is at the west end of the nave, separated from it by an arcade. The principal porch is at the west end of the north aisle. Other entrances are provided to the south aisle and north transept. At the east end of the south chancel aisle the clergy vestry is placed, and the organ-loft is constructed over this aisle, and opens into the chancel and south transept. Other vestries are also provided under the east end of the chancel. The north chancel aisle is arranged as a side chapel. The chancel is separated from the chancel aisles by arcades, which will ultimately be filled with open screens. The chancel fittings throughout are of oak. The other benches and joiners' work generally are of selected pitch-pine. The chancel floor is laid with dark red tiles. The glazing throughout is of tinted Cathedral glass. Externally the building is of flat-faced Yorkshire parquetry, with red Rainhill stone dressings. The roofs are of north-country green slates, with red Staffordshire ridge cresting. The style adopted is the Late Decorated Gothic. The architect is Mr. R. Knill Freeman, of Manchester and Bolton, and the general contractor for the work was Mr. Thomas Croft.

NEW CHURCH, SALFORD.—On the 21st inst. the new church of St. Mark's, at Salford, Chester, was consecrated by the Bishop of Chester. The edifice, which will seat about 500 persons, has been erected from the designs of Mr. T. M. Lockwood, Chester, and takes the place of the old church of the Holy Euphany.

PROPOSED NEW THEATRE, WOLVERHAMPTON.—Plans have been prepared for a theatre to be placed in Lichfield-street, Wolverhampton, near to the Victoria Hotel, and it is proposed to occupy a frontage in the new thoroughfare of 123 ft., and carry the building back upon Berry-street. The architect will be Mr. C. J. Phipps, of London.

MANCHESTER COLLEGE, OXFORD.—The new structure of Manchester College, Oxford, was opened on the 18th inst. The new buildings, which were begun about three years ago, are situated in Mansfield-road. The main buildings of the college are disposed round three sides of a quadrangle, the back of which is nearly filled by a lower range occupied by a domestic block. The rooms used by the professors are grouped in the central block facing Mansfield-road, and the two wings contain the chapel upon the south, and the library block upon the north, each terminating in a gable towards the street, and looking with traceried windows into the quadrangle. The entrance to the college is under the tower, through a hall with mosaic floor and vaulted roof, the ribs of which meet in foliated bosses, out of which archways lead upon the right into the college itself, and upon the left into the vestibule forming the approach to the chapel, and from which a staircase leads to the first and second floors. The chapel is a rectangular building divided into a nave and raised choir or morning chapel. The former is panelled with oak and the latter surrounded with oak stalls, organ-screen, and panelling, with pulpit and eagle on either side of the steps. A corridor leading out of the main entrance to the right forms an enclosed cloister round two sides of the quadrangle, with the principal's room and college office on the right, the students' common-room, cloak-room, &c., at the end, and, further on to the left, the large lecture-room and dining-room. The main staircase near the angle of the corridor ascends to the first floor, with the senior common-room (situated in the tower) and two professors' rooms to the left. It then passes on to the right up a few more steps to the library, where upon a panel over the entrance-door is carved the crest of Mr. Henry Tate, a generous contributor to the Building Fund. The library itself is a room 80 ft. by 30, with large projecting bay and oriel windows, which form inside and out two of the chief features of this part of the building. The floor, roof, and fittings are all of oak. Upon the second floor there are three rooms—a large one in the tower, and two smaller ones beyond, and the back buildings contain boiler-house, college kitchen and its accessories, with a porter's residence upon the first floor. The rooms of the college are lighted with the electric light, and the corridors with gas. The general contract has been carried out by Messrs. Parnell & Son, of Rugby, the heating and ventilating by Messrs. Haden & Son. Dr. Hopkinson has acted as consulting engineer to the Com-

mittee, and superintended the electrical work, the wiring of which has been done by Messrs. Mather & Platt, and fittings by Messrs. Hart, Son, Peard & Co. The furnishing is by Mr. James Lamb, and the carving by Messrs. Earp, Son & Roberts. Mr. W. Meldrum has acted as clerk of the works, under the direction of the architects, Messrs. Worthington & Elgood. Since the death of their partner, Mr. Thomas Worthington and his son, Mr. Percy Scott Worthington, have carried the work to completion. We illustrated the building in the *Builder* for October 24, 1891.

CHRIST CHURCH CHOIR SCHOOL HOUSE, OXFORD.—A new residence for the master and boys of the Cathedral Schools, Oxford, is in course of erection in Brewer-street. The building is from the design of Mr. H. W. Moore, of Oxford, and is of red brick with stone dressings. The internal arrangements are practically divided into three compartments, the front block forming the master's residence, the central portion the kitchen and servants' offices, and the rear block the boys' rooms and dormitories. The building work is being executed by Messrs. Symm & Co., under the personal superintendence of Mr. Axtell. Some ornamental carving has been introduced, which has been executed by Messrs. Butcher & Axtell, of London.

RESTORATION OF CHURCH TOWER, ISFIELD, SUSSEX.—On the 11th inst. the tower of the parish Church of St. Margaret, Isfield, near Lewes, was dedicated by Bishop Tufnell after restoration. The old tower, a structure of the fourteenth century, of a very plain type, was covered with a slated roof of late date. This has been removed and the walls raised about 17 ft., forming a new bell chamber with eight new windows. The walls are finished with an embattled parapet, and a spire covered with oak shingles surmounts the tower. The old bell cote has been raised up to the top of the new bell chamber, and a new floor with a panelled ceiling in oak has been placed over the baptistry in the tower. The faces of the old walls were not touched, but the angle buttresses, being much decayed, were re-faced. Stone from the Crowborough quarries was used on the rubble walling, with Stoke Grouse Bath stone in the dressings; the walling and masonry have been carried out by Mr. C. E. Bridgman, of Lewes; the carpentry and joiner's work by Mr. G. Bean, of Isfield; and the carving by Mr. G. Seale, of London. The architect was Mr. John Rawlinson, of London.

SANITARY AND ENGINEERING NEWS.

THE NEW BLACK ISLE RAILWAY.—The new line through the Black Isle, which the directors of the Highland Railway hope to be able to open for traffic next month, will, says the *Scottman*, give travelling facilities through a rich agricultural district. Leaving the main line at Muir of Ord, the new railway, which is some thirteen and a half miles in length, passes through Tarradale. Proceeding through the Spittal Wood, in which there has been some heavy cutting, the line enters the estate of Kilcoy, and passes close to the castle. Near this point the first station—Redcastle—has been erected. Running on, the railway passes close to the village of Tore, on to Munloch, and to the fishing village of Avoch. From this point the line skirts the seashore, being carried on to Fortrose at such an elevation that at some future date it can be easily extended on to Rosemarkie, and thence to Cromarty. The station buildings have been erected along the route, and the line of railway is all but completed. The contractors were Messrs. John Ross & Son, and the line was surveyed and its construction superintended by Mr. Murdoch Paterson, the company's engineer. The total cost is about 100,000.

SANITARY STATE OF TOULON. Toulon is one of the most insalubrious towns of France. She has frequently suffered from terrible epidemics, and during the course of this year there have been several deaths from cholera there and in the neighbourhood. Though Toulon has only dwellings for about 70,000 inhabitants, the newspaper correspondents estimate that the number of visitors and excursionists who went to welcome the Russian fleet at 300,000. Doubtless this figure is somewhat exaggerated. More certain data may be found in the announcement that the railway company has issued over 165,000 tickets for Toulon. In any case, it is only necessary to read the accounts of the *fièvre* to see how terribly overcrowded the town has been. Many thousands of persons were compelled to sleep in the open air, in carriages, in small boats, on the bastions of the fortifications, &c. Toulon is not a safe town to visit under the best of circumstances, but the gathering of such an immense crowd and the necessary hardships and fatigue endured by homeless visitors must have rendered it more than usually dangerous. There are scarcely any sewers in Toulon. How was the scavenging managed for this immense collection of people? Well-water of a very unsafe character is still drunk in several districts, and dust is sometimes blown into the reservoir of the town water-supply. Nor is this town water all that could be desired, for in dry weather water taken from a spring nearer to the town, and more likely to be contaminated, is mixed with the smaller but safer supply. It is fair to Toulon to add that she appears to have at last realised her insalubrious plight. Our

Paris correspondent announces an immediately projected reform, and states that, at the instance of Dr. Sambuc, an es-mayor, it has been decided by the town to adopt the Shone system of drainage.—*The Lancet*.

CITY OF ROCHESTER DRAINAGE.—The scheme of sewerage and sewage disposal, submitted by Messrs. John Taylor, Sons, & Santo Crimp, for the Borsal portion of the borough, has been selected by the Corporation as being the most suitable for the requirements of the district, and the engineers have been instructed to submit the plans to the Local Government Board in order that the necessary loan for the execution of the work may be sanctioned.

FOREIGN AND COLONIAL.

FRANCE.—The jury in the competition opened by the Bishop of Orleans for designs for stained glass windows for Orleans Cathedral, representing the history of Joan of Arc, has selected for execution the set designed by M. Jacques Galland in collaboration with M. Gissel. M. Galland is the son of the famous decorative painter who died last year.—The Preparatory Committee for the 1900 Exhibition, which is to meet at once to give a definite opinion as to the site of the exhibition, has no less than thirty-seven schemes before it. It appears probable that the choice of the committee will be for the Champ de Mars, the Esplanade des Invalides, the adjoining quays, and a portion of the Champs Elysées. The adoption of this programme will lead, as a consequence, to the penetration of some large railway lines into Paris. The line of the Lyons and Mediterranean railway will be prolonged along the quays to the Champs Elysées, meeting the Vincennes line. The "Nord" line will be prolonged in two branches, one to the Halles Centrales and the other to the Opéra. The "Ouest" line will come by way of Les Moulineaux and the Invalides to the square Cluny. The Orleans railway would also prolong, to the square Cluny, the line which was to finish at Rue Médicis.—At the Ecole des Beaux-Arts is being erected the monument to Duban, the architect, which will stand at the entrance to the large hemicycle, and will be composed of a bust in bronze placed on a marble console supported by leaves of acanthus and laurel, bears the dates of the birth and death of the celebrated architect (1797-1870). This monument is framed within a large arch flanked with Doric pilasters, and decorated with a mosaic design on a gold ground, surmounted by a triangular pediment. On the right and left of the bust are represented attributes of architecture, as well as a list of the principal buildings carried out by Duban. All the sculptural portion is the work of M. Guillaume, sculptor, Director of the Académie Française at Rome.—The monument to Barye, the animal sculptor, on the Ile St. Louis, is to be inaugurated shortly.—The new savings-bank building at Fontainebleau, designed by M. Courtois-Suffit, has just been opened.—Mr. Pavillier, Engineer-in-Chief of Ponts et Chaussées, has been appointed "Directeur-Général des Travaux" to the regency of Toulon.—A bronze statue of Chevreul was inaugurated last Sunday at Angers, near the entrance to the Jardin des Plantes.—The Minister of Marine has recently offered to the museum at Toulon a certain number of stems of vessels which have been preserved in the arsenal, and are for the most part the quite works of art. They are for the most part the work of the celebrated sculptor Pierre Puget, and represent either mythological subjects or portraits of celebrated soldiers—Bayard, Turenne, Vauban, Condé, &c.—At the same town the first stone has just been laid of a monument to commemorate the soldiers who were natives of Toulon and had fallen in battle. The monument, the model for which figured in the last Salon, is the work of M. Victor G. Ruyer.—The principal building of the exhibition which will open at Lyons next year will be of very large dimensions and of peculiar form. It is to be circular and to cover a space of 40,000 square metres. The cupola which will surmount it will have a diameter of 110 metres.—The painter Emanuel Lansyer died suddenly on Saturday last, coming out from the Franco-Russe fête at the Hôtel de Ville. He was born in 1837 at Bonin (Vendée), and studied architecture with Viollet-le-Duc, of whom he was for a long time a colleague. After that he became a pupil of Courbet and Harnpignis, and devoted himself almost exclusively to landscapes and sea-pieces. The first work which he sent to the Salon was refused, and he figured in the "Salon des Refusés" in 1865. After that, however, he was a regular exhibitor. Among his principal works may be named "Bords de l'Elle au Breton"; "Marée Montante à Ploze-manach"; "Vue du Château de Pierrefonds" (which is at the Luxembourg); "La Place de la Concorde" (for the decoration of the Hôtel du Ville); and, at the last Salon, "Le Golfe de la Paix à Menton." He obtained, besides Salon medals in 1869 and 1879, the cross of the Legion of Honour in 1881. We learn also of the death, at the age of sixty-five, of the sculptor Emile Hébert, pupil of his father, who leaves a considerable amount of work behind him; especially may be mentioned

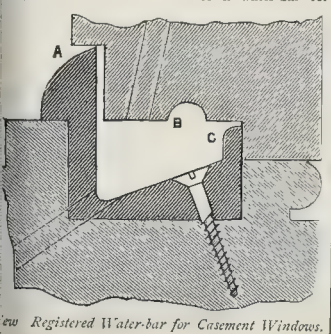
the group "Toujours et Jamais" (Salon of 1859), a statue of Regnard at the Hôtel de Ville, and (at the last Salon) a bronze bas-relief entitled "L'Oracle."

BERLIN.—The offices of the new Town Hall, which was erected between 1860 and 1870, but has only lately been completed internally, have long given rise to complaint as to their inconvenience and inadequateness. The authorities have now decided to erect a large new administrative block for office purposes, and have bought some land next to some property already in their possession at a cost of about 5,000,000 marks, or 250,000*l.* It was found impossible to obtain a site in close proximity to the Town Hall. The position selected for the new building is on the banks of the Spree. It adjoins the historical municipal orphanage which is for three pulled down, and is some five hundred yards distant from the Town Hall.—The preliminary arrangements for the proposed National Industrial Exhibition, which is to be held at Berlin in 1896, are nearly complete, although there has been some short-sighted opposition on the part of the municipality. The "Architekten Verein" will be represented on the managing committee by three very influential members.—Herr Appeltius, Herr Schultz, and Herr Garbe.—The special Government Commission, which has been deliberating for some time as to the revision of the Berlin Building Act, has apparently decided as to the advisability of the alterations proposed by the "Vereinigung Berliner Architekten," a society which represents the interests of the private architects and their clients. Two members of the "Verein" have been invited to join the Commission, and the society has selected Herr Kayser (of Messrs. Kayser & von Grossheim) and Herr March to be their deputies. Herr Spiecker, the head of the Government Board of Works, presides.—According to the latest estimate, the proposed Dortmund Canal will cost Germany about 3,500,000*l.*, of which sum 500,000*l.* has already been spent. The canal will have a length of 200 kilometres.—A gathering of the members of the Amalgamated German Historical and Archaeological Societies took place at Stuttgart. The chief subject discussed was that of the preservation of archaeological monuments. Several papers of interest were read. The societies can boast of a total of 35,000 members.—The historical "Dom" at Ritzburg, the erection of which can be traced back to the twelfth century, was the scene of a serious fire caused by lightning. The roofs, spires, bells, and organ were destroyed. The German contemporaries, the *Centralblatt der Bauverwaltung* and the *Deutsche Bauzeitung*, whose illustrations have been mostly in the form of wood-cuts, have met with a serious loss in the death of Herr Otto Ebel, who was the only architectural wood-cutter of note in Berlin, and whose excellent work has for many years adorned their pages.

AUSTRIA.—The twenty-ninth anniversary of the foundation of the Imperial Fine Arts Museum at Vienna has been celebrated with some ceremony. In connexion with the Museum there is a training school of some pretension, organised on the lines of our South Kensington Art Schools. The institutions have been greatly assisted by England, the Prince Consort taking lively interest in their development. The Arnold Society among others contributing largely to the collections.—At Salzburg, Messrs. Felner & Hellmer's new Municipal Theatre has been opened this month. The building, which holds an audience of one thousand, and cost about 300,000*fl.* or 24,000*l.*, has been erected in the short space of eighteen months. It has been planned in accordance with the new Austrian theatre regulations, and fitted with all the necessary modern improvements, including an iron stage and electric lighting. The scene-store and workshops have been housed in a separate building.—Architects preparing plans for the laying-out and extension of Vienna in accordance with international competition regulations lately issued will do well to communicate with the promoters, as some changes have lately been made in the requirements.

MISCELLANEOUS

A NEW WATER-BAR.—The accompanying diagram shows the section of a water-bar for



Registered Water-bar for Casement Windows.

casement windows, made in brass or copper by Messrs. Jas. Hill & Co. It is claimed that in this three "lines of defence" provided: A, the "drop check," acts in the same manner as placing the tip of the finger to a hanging drop of water; B and C are the second and third checks. The channel being sloped, the screw head can never be in water, thus preventing the sill from being rotted; and the strength of the portion at A prevents damage by stepping on to the sill.

PUBLIC IMPROVEMENTS, SHEFFIELD.—On the 10th inst. Colonel W. M. Ducat, R.E., an inspector appointed by the Local Government Board, attended at the Town Clerk's offices to hold an inquiry into the application of the Corporation to borrow 300,000*l.* for the purposes of the Sheffield Corporation (Street Widening) Act, 1893, and 24,130*l.* for purposes of Water Supply Act. The Town Clerk (Mr. J. W. Pye-Smith) explained the nature of the proposals in regard to the High-street widening. The street, which is the main artery and which connects the east and west side of the city, would be made 80 ft. wide. For many years it had been very inconveniently narrow, and the widening will be from Fargate to the end of Market-place, terminating on the west side of Change-alley, and from the east side of Change-alley to Fitzalan-square. The plans of the proposed widening were shown to the inspector, and it was explained that the paving would be of gristone, not granite, the latter being utilised in the channelling. The application for 24,130*l.* was, the Town Clerk said, made for capital expenditure on the Dam Flank Reservoir, 28,882*l.*, having already been expended for the work on two applications. That money, which at the time was considered sufficient, had been expended, and the work not yet completed. Mr. E. M. Eaton, Engineer to the Water Works Department, explained that the work for which this money was required was to make the dam watertight. It was anticipated when the reservoir was made that some such work would be necessary, but as the expenditure would prove very large it was considered advisable to wait and see how far the rock and shale would prove watertight. To complete the whole work they were making a wing trench.—There was no opposition to either of the applications, and the inspector afterwards visited the scene of the High-street proposed improvements and drove out to the reservoir.

NATIONAL BREWERS' EXHIBITION.—The fifteenth annual exhibition and market of machinery, appliances, and produce used by brewers, and those engaged in allied trades, was opened on Monday at the Agricultural Hall, Islington. Over 600 firms are exhibiting, and the exhibition is said to have been in a complete condition on the day of opening. We shall probably give a short account next week of the machinery exhibited.

ROBERT BOYLE & SON, LTD.—The Directors of Robert Boyle & Son, Ltd., ventilating engineers, London and Glasgow, have resolved to recommend a dividend of 12*½* per cent. and a bonus of 2 per cent., free of income-tax, on the Ordinary and Deferred shares of the company for the year ending September last, after placing to the Reserve Fund one-sixth of the profits earned, in accordance with the rule adhered to since the first year of the company. This makes the eighth dividend and completes the payment of cent. per cent. upon the subscribed capital of the company. The year ended is stated to have been the most prosperous since the formation of the company.

PUBLIC WORKS IN MEXICO.—According to a recent report of the British Consul at Mexico upon the trade of the Federal District, there was expended last year in the City of Mexico upon alterations and repairs to municipal buildings, construction of and repairs to sewers, laying pipes for the water supply, and paving the streets the sum of 73,687*l.* The system of paving the streets with asphalt blocks, which has been in use during the past three years, has given better results than those of wood pavements. The blocks are made of a mixture of pulverised asphalt and limestone rock, cemented together under heavy pressure, and laid on a foundation of rubble. The cost to the Municipality is 1*l.* per square yard of pavement, the contractors being obliged to keep it in good repair for six years. The great work of the drainage of the Valley of Mexico is within measurable distance of completion. On May 16 7,470 lineal yards of the tunnel were completed out of a total of 10,871 lineal yards, and of the 3,387 yards which remained 283 yards of heading, the most troublesome part of the work, were done. In the great canal, which when finished will be 51,545 yards long, 9,550,771 cubic yards out of a total of 15,173,617 cubic yards had been excavated. The total cost of the tunnel and canal has been 1,473,738*l.*, the work having been heavier than was expected. Owing to the unanticipated amount of water met with in making the tunnel, the cost per lineal yard averaged 66*½* s*g.* od., a sum very much in excess of the contract price. The original estimate was 361,538*l.*, but the actual cost will be about 50 per cent. in excess of this amount. The contract for the canal was 1,000,000*l.*, of which 761,500*l.* has been expended, and 475,000*l.* more will be required for completing the work. Calculated from the standpoint of the original estimates, about 24 per cent. of the whole work of the tunnel and canal remains to be done, at

an estimated cost of 678,188*l.*, which, being based on the results obtained from experience extended over a considerable period, is probably sufficiently accurate.

DISCOVERY OF A THIRTEENTH-CENTURY PISCINA AT COWBRIDGE. During the recent restoration of Cowbridge Church, carried out by Messrs. Hatherly & Carr, builders of Bristol, under the direction of Messrs. Bruton & Williams, architects, of Cardiff, a discovery was made in the south wall of the chancel of a well-preserved thirteenth-century piscina, which had been at some time filled up with rubble walling and plastered over.

CAPITAL AND LABOUR.

THE BLACKBURN BUILDING TRADE DISPUTE.—At a meeting on the 20th inst. of masters and men engaged in the Blackburn building trade a settlement was arrived at of the dispute which has lasted, in the case of the plumbers, since March, and, as regards all other branches of the trade, since July last. Under these terms, which only require formal ratification by the Masters' Association, considerably over 1,000 men, have, we understand, returned to work.

MEETINGS.

FRIDAY, OCTOBER 27.

Architectural Association.—Annual conversazione, Royal Institute of Painters in Water Colours, Piccadilly. 8 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Mr. W. C. Tyndale on "House Drainage." 8 p.m.

SATURDAY, OCTOBER 28.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Visit to Isolation Hospital, Museum, Sanitary Depot, Sewage Disposal Works, &c., Highgate. 3 p.m.

Northern Architectural Association.—Visit to the Ouseburn Board Schools.

MONDAY, OCTOBER 30.

University College.—Lectures on Chaldean and Assyrian Archaeology, by Mr. W. St. Chad Bosworth. 11. 5 p.m.

TUESDAY, OCTOBER 31.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Mr. Charles Mason on "Scavenging, Disposal of House Refuse." 8 p.m.

WEDNESDAY, NOVEMBER 1.

Royal Archaeological Institute.—(1) Mr. E. Peacock, F.S.A., on "Immuring Nuns Who Have Broken Their Vows"; (2) Mr. E. Green, F.S.A., on "The Beginnings of Lithography." 4 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Visit to Disinfecting Station at St. Pancras. 3 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting. 8.30 p.m.

Carpenters' Hall (London Wall, E.C.).—Professor Banister Fletcher on "Building and Sanitary Construction."

THURSDAY, NOVEMBER 2.

Arts and Crafts Exhibition.—Mr. William Morris on "The Printing of Books." 8.30 p.m.

University College.—Lectures on Greek Sculpture: Pheidias to Lysippus, by Professor Percy Gardner. 11. 5 p.m.

Sanitary Institute (Lectures on Sanitation of Industries and Occupations).—(1) Dr. Arthur Newsholme on "Occupation and Mortality." 8 p.m.

FRIDAY, NOVEMBER 3.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Professor A. Wynter Blyth on "Diseases of Animals in relation to Meat Supply," Characteristics of Vegetables, Fish, &c., unfit for Food." 8 p.m.

SATURDAY, NOVEMBER 4.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Visit to Wimbledon Sewage Farm. 3 p.m.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

20,082, WALL-PAPERS: A. L. Gwatkin.—When wall-papers are printed or the pattern is applied in wash colours or "stains" it is difficult to obtain an even tone through the pieces to be printed; but in this patent in lieu of forming the piece of paper with a plain edge or margin, portions of the more pronounced features of the pattern are printed upon the edges, so as to project laterally from the body of the pattern, or suitable intervals are provided with corresponding recesses or projections. In hanging the edge is cut away, leaving these recesses or projections so as to hide or disguise the joint.

20,448, METALLIC CEILINGS AND WALLS: W. W. Horn.—This invention consists of metallic panels formed with flanges adapted to engage grooves formed in furring strips secured to the supporting beams or joists and covering strips of metal for the furring strips with flanges interlocking with the flanges of the panels.

20,603, WINDOW OR DOOR FASTENING: Sir D. L. Salomons, Bart.—An electrical switch which lights the closet when the door is bolted; also applicable to stoke-holes, photographer's dark-rooms, &c., and for windows, &c. The special feature of the invention is the bolt engaging the door or window and switching on the light or bell by completing the circuit.

20,691.—WHITE LEAD AND COLOURED PIGMENTS: R. Matthews and another.—According to this invention any lead, oxide, litharge, or massicot, or a natural carbonate of lead is oxidised and ground in water until a hydrated lead float is obtained. This is then treated with an acetic solution and with a solution of soda so as to produce a white or coloured pigment of special permanence.

1,072.—GULF TRAP: A. Ford.—The objects of the invention are to enable the inspection and cleansing of the drain from the body of the trap, to prevent unsealing of the trap by syphoning or evaporation, and securing a deep

ral Society, Limited. Mr R. Lockwood, architect,			
thorpe, near Doncaster. Quantities by architect —			
cott	£1,397	10	Joseph Clare, Scun-
att	1,360	10	thorpe, Doncaster* ..
Hollingsworth ..	1,197	0	£1,160 10

* Accepted.

The Builder.

VOL. LXV. No. 268.

NOVEMBER 4, 1895.

ILLUSTRATIONS.

The Ancient Cathedrals of Scotland: V., Iona, from the South.—Drawn by Mr. Alexander McGibbon	Double-Page Ink-Photo.
Plan of Iona Cathedral.—Measured and Drawn by Mr. Alexander McGibbon	Double-Page Photo-Litho.
Design for St. Andrew's Church, Ayr.—Messrs. Morris & Hunter, Architects	Double-Page Ink-Photo.
Apse Windows, Hillhead Established Church, Glasgow.—By Messrs. Shrigley & Hunt	Single-Page Ink-Photo.
Cartoon, St. John's Church, Silverdale.—By Messrs. Shrigley & Hunt	Single-Page Ink-Photo.

Blocks in Text.

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Cleaning a City.



VIENNA, which is well known for its bad pavements, which contrast so unfortunately with the surroundings of its beautiful thoroughfares, also has the reputation of being a badly-scavenged city. This latter qualification, it is true, may have partly arisen from the difficulty experienced in properly attending to the bad pavements, but it is certainly mainly due to the bad organisation up till now of the Vienna Scavenging Department—or rather the want of system or uniform working of the many departments of the different city districts, which are ruled by separate committees, somewhat like the London vestries.

Prompted by a public outcry, after successive hot summers and cholera scares, the municipality of the Austrian capital has at last approached the question of its street-cleaning seriously, and has apparently come to the conclusion that the unnecessary expense and bad results of mismanaged scavenging can no longer be tolerated. Herr Stritzl, the second officer of their fire-brigade, whose talents for organisation have been proved both in that force and in the Royal Engineers, in which he formerly held a commission, has drawn up an elaborate scheme for a new Scavenging Department, and we hear that his suggestions are now to be acted upon. Herr Stritzl's scheme is based on studies in the more important capitals of the Continent, in London, and in several provincial towns. Berlin has apparently been taken as a model by the author as far as general organisation is concerned—London (City), Brussels, Paris, and Budapest respectively for certain more or less important details.

Herr Stritzl certainly aspires to a very high degree of cleanliness, and he proposes to give his fellow citizens this boon by the rational management of a single independent municipal department, at a less cost than that of the present unsatisfactory state of affairs. At present the work is practically done by some hundred contractors severally working for different localities. In the first year,

where the expenses of establishment have to be taken into account, over half-a-million florins are to be saved, and after the first year the estimates show that the ratepayers will be saving something over a million florins, or about 85,000*l.*, annually of their present regular expense, so that the proposed reform will also have pecuniary advantages. According to Herr Stritzl the scope of the new Vienna Scavenging Department will embrace:—

- (1) Street-cleaning and the disposal of street refuse.
- (2) The disposal of house refuse.
- (3) The treatment and disposal of snow.
- (4) The watering of all thoroughfares.
- (5) The cleansing and disinfecting of public lavatories.

The street-cleaning is to be mainly done by machines, as their relation in cost to manual labour has been determined to be about as 3½ to 21. There are to be three systems of cleaning—i.e., the constant service, the nightly service, and the irregular service, which latter only requires the attendance of cleansing apparatus in certain thoroughfares every second or third night, or even once a week, as the case may be. The actual thorough cleansing in all cases is to take place at night between the hours of 11 p.m. and 7 a.m., a period selected to accord with the general sleeping hours of the population. For the constant service, besides the night work, there will be an additional attendance of scavenger patrols not dissimilar to those of scavenger boys in our city. This constant service is, of course, only intended for thoroughfares which have an exceptional amount of traffic. The street refuse is in all cases to be taken to the river-embankment, where, after a rough sorting, it will be shipped as manure to the lower reaches of the Danube. It would be well to remark that the patrol scavengers are not to store the refuse they have collected in small fixed dustbins, as we see on the curbs of our city pavements, but in larger ones placed in less-frequented positions away from the leading thoroughfares, to which the refuse is taken in light iron barrows.

The house refuse is to be collected in the early morning between five and seven o'clock. Light portable iron dust-bins are to be used by the householders, their size being limited, as the one-horse dust-carts will only be attended by one man in each case, who acts

both as driver and collector. The dust-carts will be built to a London model, and supplied with M. Nossian's patent covers made in two parts, and the greatest care is to be taken that the collection and transport causes no nuisance to passers-by. The natural waterway of the Danube will here again be used for the disposal of the rubbish after the rough sorting-out has taken place.

As regards the treatment and disposal of snow, it is interesting to see that salt or other chemicals are not to be used by the scavengers. A combination of ploughs and manual labour is to be adopted, and the snow is to be disposed of at as many points as possible outside the town. As the apparatus at the disposal of the Scavenging Department will be insufficient to meet any extraordinary snow nuisance, extra carts and men will be specially engaged when necessary, contracts always being arranged for some months previous to the possible requirement.

The watering of the Vienna *boulevards* and open spaces is to be direct from the hydrants, whilst the roads will be attended to by one-horse iron water-carts. The watering-carts are to be in constant attendance, with scavengers on night duty throughout the year, and every road has to be watered one hour previous to the scavenging machine passing over it. Then in the summer the roads are to be thoroughly drenched from 4 a.m. to 8 a.m., and further watered at intervals during the day.

It may seem strange that a fire brigade officer in Vienna should be advising the use of fire hydrants for watering and scavenging purposes, whilst on the recommendation of the London brigade authorities our County Council is trying to prohibit similar use of its fire-cocks. We must, however, bear in mind that in Vienna the scavengers and watermen are to be a carefully-trained and responsible body of municipal labourers, to whom an act of negligence might mean instant dismissal, with disgrace and loss of pension. It is unlikely that the firemen will be much handicapped by the scavengers, and yet it would certainly have been preferable to keep the sole usage and control of the hydrants entirely in the hands of the firemen, who have to rely on them in emergencies. As regards the public lavatories, of which there are a great number in Vienna, each one will have to be thoroughly

cleaned every twenty-four hours, strong disinfectants being used.

The entire superficial area of the thoroughfares of Vienna may be taken at 5,000,000 square metres, or 53,750,000 square ft., of which about 2,000,000 square metres, or 21,500,000 square ft., will have the regular nightly service, and 600,000 metres or 6,450,000 square ft., the constant attendance. Actual scavenging will probably only be necessary on 250 days annually, as during the season of snow the street refuse will be removed together with the snow and counted under that heading, whilst after heavy rainstorms no cleaning will be required.

To attend to the streets according to the three systems described, as well as to do all the other work in the hands of the Department, the scavenging force in Vienna is to be firstly divided into forty units for night street service, each of which will consist of one foreman, ten scavengers, and a driver with a horse and sweeping machine, and secondly there is to be a gang of 120 men whose main duty will be to supply the day patrols necessary on the road having the constant service, and clean the public lavatories. There are to be ninety one-horse dust-carts with their respective drivers regularly on duty, whilst a reserve of ninety carts will always be kept for emergencies. Another ninety horses with their drivers will be required for the forty sweeping-machines, the water-carts, and a reserve supply as the case may be. The management of the whole department will be in the hands of a director, a sub-director, and twenty inspectors, and these, with the companies spoken of and the patrol men, will be practically grouped in four sections. The sections will each have a district to attend to, the limits of which have been carefully mapped out with due consideration of natural boundaries, stations for the disposal of refuse, &c., and the suitable sites for new depôts. To avoid having the depôt of the section in charge of the inner town in a densely-populated neighbourhood, this station will, however, be placed outside the city, in connexion with the depôt of another section. This double depôt will be the headquarters of the Department.

It would lead too far to give all the details of Herr Stritzl's scheme, but the following particulars may call for attention. The sweeping-machines are to be those of Messrs. Beermann, of Berlin, and the dust-carts which are recommended are those made by Messrs. W. Smith & Sons (Barnard Castle). The water-carts are to be of iron, the tank, of cylindrical form, holding 1,500 litres.* The horses are not to cost more than 650 florins, or 54*l.* each. The price to be paid to the Department for the refuse is estimated at 45,000 florins, or about 3,750*l.*, and the annual contribution from the tramway companies is fixed at 13,000 florins. The total cost of the Department annually after the first year is to be about 720,000 florins, or 60,000*l.*, as compared with the present average cost of about 1,800,000 florins, or 150,000*l.*

Before leaving the proposed reforms at Vienna, it may be of interest to compare some parts of her scheme with those of existing organisations in other capital cities.

The Scavenging Department at Berlin, which (as mentioned above) served as a model for the Vienna scheme, has to deal with the cleansing of some 4,850,000 square metres, or about 52,140,000 square feet of thoroughfares, but the cartage and disposal of the street-refuse is here in the hands of contractors. The cartage and disposal of the snow and the house-refuse is likewise done by contract, the actual cleansing and watering of the roads practically being the only work managed by the department without the aid of middlemen. It is true that the public urinals are also attended to by the Department's own servants, but as these are comparatively few in number, owing to the erection and management of the more comprehensive public lavatories being a special

company's monopoly, the work thus occasioned is of little count. The municipal Scavenging Department at Berlin has already been in existence some fifteen years, and its uniform and systematic methods, which are governed by one central authority, have been generally appreciated. The plan of having constant, regular, and irregular services, according to circumstances, has been proved successful, and though no less than 3,150,000 square metres of the 5,465,000 have the regular attendance, which means a cleansing once in every twenty-four hours, the financial results have also been highly satisfactory. The entire cost of the Department in 1890 did not exceed 73,000*l.* (after the contribution regularly received from the tramways companies had been paid in), the number of men and boys employed in the force being 694 of all ranks. In Berlin the organisation of the scavenging force shows that the city has been divided into six districts with twenty-two sub-sections. Each section has an inspector and each district a superintendent, the whole being managed by the "director" of the department, whose salary is 500*l.* per annum. Each section has two scavenging-machines with a complement of scavengers, and these are employed for night work only. A certain number of youths and men are stationed with the sections in charge of the central part of the town for the hours of daylight, and these attend to the so-called "constant" service, which here includes a daily second thorough washing of all thoroughfares with asphalt pavements.

The Berlin water-carts show the dimensions, shape, and materials to be adopted in Vienna, and the Beermann scavenging-machine is likewise employed in this city. No horses whatever are bought by the department, as even those for the water-carts and sweeping-machines are jobbed by the year, together with the drivers necessary for them. The contractors, who have the disposal of the refuse in their hands, generally use their own barges on the river Spree to distribute such of it as can be used, in the sandy province of Brandenburg, for the cultivation of crops; and we hear that fair prices are paid them for their supplies. A special feature of the Berlin scavenging service is the rapid attendance to all gullies, &c., when there are heavy rains, to which the city is prone. Berlin has numerous basement abodes which are easily flooded if the water does not flow off properly. Such accidents would generally occasion the presence of steam fire-engines or other appliances, which can be procured from the fire-brigade to pump them dry. Berlin being built on a very bad soil, these matters require more than ordinary care, and it is considered legitimate to request the presence of firemen on such occasions, as in several cases the collapse of buildings has thus been prevented by them. When, as in 1891, however, no fewer than thirty calls for this purpose were made on the brigade during one hour, only the most dangerous cases can be attended to. It would lead too far to give further details, or to explain more fully the theories according to which the efficient Berlin Department is worked. Those who are, however, interested as to the latter question would do well to refer to Mr. James Pollard's excellent "Study in Municipal Government," to which we referred some time back.

To describe even in outline the organisation of the Paris Scavenging Department would require too much space, as its methods are complicated in the extreme. No less than 3,100 persons (men, women, and children) are employed, the number of sections into which they are divided being 420, and the strength of each section fluctuating according to its position, from one to four foremen, with fifteen to twenty-five men, in each case under an inspector. In 1891 the Department cost 3,300,000 francs, or about 132,000*l.*, of which 1,858,000 francs, or some 74,000*l.*, were paid to the contractors, who (as in Berlin) have the disposal of the refuse in their hands. The thoroughfares under the control of the Department, which have a

superficial area of 5,464,000 square metres, or about 58,750,000 square feet, are attended to by its permanent staff; a fall of snow, however, generally requiring the engagement of extra assistance. The hours of duty for the majority of the scavengers are from 4 a.m. to 11 a.m., whilst a certain number stationed on the inner districts have extra duty from 1 p.m. to 4 p.m. besides. In Paris salt is used to some extent in combating the snow; though manual labour, combined with snow-ploughs (heavy concerns requiring four horses and two men each) is mainly employed. The watering of the streets is done to a large extent from the hydrants, with the aid of a hose and sprinkler; 3,143,000 square metres, or some 33,800,000 square feet, being treated in this manner. A large area, however, still receives regular attendance from water-carts, of which Paris has 370. The number of scavenging machines in the hands of this Department is 56, the patterns employed being either of the "Sohy" or "Blot" type. As observed above, it would lead too far to attempt to describe how the three thousand labourers of the Department find employment, what methods have been adopted, &c., but it would be well to point out that though under a central authority, as in the case of the Paris Fire Brigade, the extreme limit of decentralisation has been here reached, and a great deal of the strength of the Department is thus frittered away. In judging the number employed it is, however, also necessary to consider that, whilst Berlin only employs men and boys of good physique, Paris lays no stress on this point. The pay is also very poor, and insufficient to procure the nourishment necessary for energetic work. The Scavenging Department at Paris stands under the supervision of the Préfet of the Seine, certain civil engineers of the Public Works Department having the direct control of the institution. It has, we believe, been in the hands of this office since 1859.

At Brussels the Scavenging Department, which is under a special committee of the Municipal Common Council, has practically the same duties as Herr Stritzl proposes for the new Vienna force. Here the services of contractors are dispensed with, everything necessary for the Department, including the horses, being in the hands of its own officials. The superficial area of the thoroughfares which have to be attended to is about 1,500,000 square metres, or some 16,125,000 square ft. Including drivers, the staff numbers 377 men of all ranks, the organisation dividing this number into sections for regular service, and a special gang for the cleansing of lavatories. The sweeping machine is much used, though the hilly nature of the town and its bad pavements often cause difficulties. Each section has four machines, two water-carts, four dust-carts, with a complement of ten horses, ten drivers, and fourteen scavengers, under the charge of an inspector. For the regular night service the hours are from 9 p.m. to 7 a.m., whilst the constant service necessary on certain thoroughfares requires the attendance of several special sections for the day-time. The disposal of the refuse takes place with the aid of boats. The refuse is utilised for farming purposes after a rough sorting has taken place. The collection and cartage of the house-refuse takes place between 7 a.m. and 9 a.m. The use of salt for getting rid of snow has been prohibited in Brussels, owing to the damage done thereby to macadam pavements and to the boots of the public. Horses and dogs are also supposed to have suffered from the use of salt, so that after some discussion the experiments made with this material had practically to be stopped. Though no less than 1,022,000 square metres of the 1,500,000 superficial area of the thoroughfares is daily attended to, and the total receipts for refuse, &c., only amount to about 155,000 francs, or 6,200*l.*, the cost of the Department, which has to be borne by the ratepayers, does not exceed 387,000 francs, or about 15,500*l.*

To compare the proposed Vienna scheme or any of the existing municipal scavenging

* A litre is .22 of an English gallon.

departments alluded to with our London arrangements would be an impossibility, as the chaos here is too great, and the want of system, uniformity, or even rational management is nearly everywhere evident. In the City proper, which can be treated as a whole, under its own central authorities, we alone have a most satisfactory exception; but a description of the treatment of the roads of this square mile, with its smooth pavements on the one hand and its enormous traffic on the other, would be of no value for comparison with ordinary cases. Some day, when the London County Council believes it has improved our morals by doing away with music-hall promenades, it may find time to give more attention to such matters as concern our bodily welfare. Quite setting aside the major questions of the actual scavenging, refuse-collecting, &c., let us take a single detail, such as the clothing of our scavengers. Is it right that the majority of the men should be allowed to take to their homes all the filth collected on their garments after a day's work? The amount of disease thus carried about in our most ill-kept-for neighbourhoods is certainly a more important feature of London life than the supposed possible increase of immorality through the promenade of a West-end music-hall.

NOTES.

AT last there appears to be some prospect of a settlement of the coal war, though the terms are yet uncertain; and, indeed, the only ground for hope is in the willingness of the combatants to meet and endeavour to come to an understanding. This long-deferred meeting takes place to-day (Friday), and the result is awaited with much anxiety, the advent of wintry weather having intensified the general desire for a speedy termination of the struggle. In all probability victory will rest with the men—that is, in appearance. But, as a contemporary puts it, "they have really been taking upon themselves the task of reducing supply, and so far from having successfully resisted a reduction, they have themselves provided the fund for the maintenance of the rate of wages." It might fairly be added that the public have had to bear a considerable share of the cost: but there is a wide difference between the inconvenience and loss of the manufacturer and householder, and the long-continued privation and the desolated homes of the miners. It has, in truth, been a disastrous conflict, and the only real good that can come of it will be the adoption of some means for the avoidance of similar costly struggles in the future. There certainly seems to be a very general desire for the formation of a conciliation board to which disputes in the coal trade may be referred, and it is to be hoped that such a tribunal may very soon be in existence.

IN the recent annual report of the Board of Trade in regard to railways it is stated that during the past year there have been some five-and-twenty accidents at level crossings. The time has come when the Board of Trade should obtain legislative power to oblige a railway company to discontinue a level crossing where there is any appreciable highway traffic. At present the Board of Trade can only suggest that a crossing be put an end to, but these suggestions are useless. A railway company knows quite as well as a Government Department if a crossing is or is not a public danger, but it does not follow that if a crossing is of the latter kind the railway company will necessarily spend money in building a bridge. But such crossings in places where there is any extent of vehicular traffic are a danger and a delay, and in many cases also the wages of a gate-keeper would go a long way to pay the interest on the capital expenditure in altering a level crossing so as to conduct the highway above or below the line.

THE case of the Queen v. The London County Council, which was decided by a Divisional Court of the Queen's Bench Division last week, although it arose out of disputes in regard to buildings in London, was in truth a question depending on a general principle. Under the London County Council (General Powers) Act of 1890 an appeal lies from the decision of the superintending architect as to the general line of a building to a special tribunal composed of three persons—one member to be appointed by the County Council, one by the Royal Institute of British Architects, and one by the Surveyors' Institute. The member chosen by the Council was also chairman of the Building Acts' Committee of that body, and in this particular case this Committee had ordered legal proceedings to be taken against a certain individual. The appellate tribunal had practically also confirmed the decision of the architect as to the building line. The question then arose whether the decision was not void on the ground that one member of the tribunal was an interested party. The Court held that the objection was good and declared the proceedings void. It is impossible not to smile at the want of legal knowledge as well as of common sense which allowed a member of the Building Acts' Committee to be a judge, so to say, in his own cause. The decision of the Queen's Bench Division is founded on well-known principles, and it will be a warning to the Council to be more careful in such matters in the future. The warning is the more needed because we have no doubt that on the facts the architect and the appellate tribunal were quite right, and it is a waste of money for legal proceedings to be taken under such circumstances, since they could have been avoided if the Council had placed an unbiased member of their body on the appellate tribunal.

A CORRESPONDENT of the *Athenæum* of October 28 has discovered a mare's-nest. He professes to have "rediscovered" the remarkable little Roman circular temple at Keston, Kent, which Mr. Kempe discovered and opened out to view in 1828. It has never been lost sight of. The correspondent in question is a F.S.A., but he appears not to be aware of the clear and ample memoir published by his Society, nor of the plan of the discovery which accompanied it, in "Archæologia," Vol. XXII, plate 32. This is all the more remarkable since the Noviomagian Club, consisting entirely of Fellows of this Society, was formed many years since with the object of keeping green the memory of the lost city of Noviomagus. Of all sites that have been suggested for it, this at Keston is by far the most likely one. There is remarkable difference between Mr. Kempe's plan, drawn after three weeks' careful exploration, and that published by our contemporary on its correspondent's authority. The former shows a circular building nearly 25 ft. internal diameter, with six radiating buttresses spaced irregularly, and a separate, detached tomb about 8 ft. square to the north. The latter shows the same circular building quite 25 ft. in diameter, without the radiating buttresses, and with an apse due east opening out of the circle, while two parallel buttresses mark a front exactly west. And behold! the whole is supposed, in consequence of plan and position, to be a Christian church of Roman date! All this is from "accurate measurements"! It may, perhaps, be that the tomb building has been mistaken for the apse; but then it has a square ending, it is detached, and its axis is north and south, and not east and west. We doubt not but that our contemporary will ask its correspondent to explain. The discovery has been noticed in several more recent works. We had no difficulty, several years ago, in finding the site by the aid of Mr. Kempe's map. The temple stood on high ground overlooking several fields which contain many evidences of building

scattered over a wide area. On still higher ground, in Keston Park, are the high banks and deep ditches of a British *Oppidum*, or fortified town, and close at hand, in a spot of much beauty, is the source of the Ravensbourne. The whole district, very rural and unbuild upon as yet, would eminently repay far more investigation than it has ever had. We have heard very little of late of the Noviomagian Club. Here is a very ample field for it to investigate.

FROM Dr. Dudfield's last four-week report to the Kensington Vestry we find that, in accordance with a suggestion originally made by him, progress is being made towards the production of a drainage map of the parish by inserting all new sewers and drains on the existing ordnance maps; and it is to be hoped that the material for making and keeping up-to-date an accurate drainage plan of the district will thus be obtained. All the London parishes or districts ought to make it an object to prepare a drainage plan in the same manner; it is of the greatest importance to have an accurate and reliable record of the drainage lines. Another point touched on in Dr. Dudfield's report is the case of a proposed building which was objected to as an "obstructive building" within the meaning of the Housing of the Working Classes Act, 1890. This is a point that architects and builders will do well, in their own interests, not to lose sight of when planning new buildings in crowded quarters; while on the other hand it is to the interest of vestries to condemn such buildings in advance and prevent their erection, since, as Dr. Dudfield points out, if a Sanitary Authority has to compel the demolition as "obstructive" of a building already erected, the whole cost of the demolition as well as compensation to the owner must fall on them, as the law only provided for the case of old obstructive buildings, not contemplating the erection of new ones.

A "MAYOR" writes to the *Times* that, having business with an official at the Local Government Board, he was obliged to ascend eighty steps to arrive at his room, and he asks why the Government Departments are not supplied with lifts. The only answer is that Government Departments have no regard to the convenience of the general public, and that the Treasury prevent any improvements, however necessary, unless sufficient pressure can be brought to bear so as actually to oblige them to sanction the work. There ought long ago to have been lifts at the Law Courts; in any similar building used for business purposes a lift would have been provided years ago. But, necessary as they are, the Treasury will refrain from finding the required money until outside pressure is used which cannot be resisted. These are but instances of a refusal to spend money properly, whilst, on the other hand, abundant instances may be found of money being wasted by public departments, as in the wages of the numerous unnecessary attendants at the Law Courts. The evil arises from a want of intelligent organisation; money must be saved, and the Treasury regard it as easier to refuse expenditure on new works than to reorganise and also spend money.

OUR contemporary the *Deutsche Bauzeitung* has devoted some space to an illustrated article on the proposed new National Museum for Darmstadt, which is apparently to mark the commencement of the new Grand Duke of Hesse's reign. The scheme has been long talked of; in fact, a public competition for the design was held early last year. Unfortunately, however, for the successful competitors, Herr Neckelmann and Messrs. Gropius & Schmieden, the regulations, in accordance with which they had worked, cannot be said to have properly expressed the actual requirements, nor could any of the drawings submitted be termed so remarkable that the promoters could be

expected to specially invite one or more of the candidates to submit further designs. The new Grand Duke, on looking into the matter, preferred in fact to invite a non-competing, Herr Alfred Messel, to prepare a design, which, having met his approval as well as that of his Ministers, will now soon be carried out, if no unforeseen opposition be raised against it by his "Diet." The cost of the new building, which is to have its site adjoining the theatre, is estimated at about 75,000*l.* In plan the extreme compactness and practicability of the proposed building deserves attention; unfortunately the elevation is in the typical cold academical style of the Berlin school. Herr Messel, whose drawings of extensive blocks of business premises we published in 1891, is a Hessian by birth. In Germany he enjoys a repute for masterly detail and successful interior decoration, and he has lately accepted the post of an assistant master at the Berlin Arts and Crafts Schools in connection with the Royal Museums.

FROM Dr. Horne's report to the Local Government Board on the condition of the Usk Urban Sanitary District, and the prevalence of diphtheria there, it appears that the district is partially supplied with water of good quality by the Usk Waterworks Company, which commenced its service in September, 1891, but that the great majority of the houses are not supplied with the Company's water, but obtain their supply from pump wells, averaging 12 ft. or 14 ft. in depth. These wells are merely dry-stained, and are often indifferently protected against surface contamination. The report continues:—

"Considering the numerous privy pits, collections of refuse, and defective gullies scattered throughout the district, and bearing in mind also the nature of the soil, pollution of these wells would appear almost inevitable. I learnt that during dry weather the water in most of these wells becomes very low, and at such times is often thick; moreover, it is quite common to find insects of various kinds, or slugs, or worms alive or dead in it. Yet, apparently such obvious dangers to public health are unheeded by the Sanitary Authority, for during my inspection a new pump was being fixed to a well for providing a water-supply to a house under the following circumstances:—The well, itself of the character already described, was approximately in the centre of a yard about 12 ft. square, paved with cobble "pitching." Near to the back door of the house, which opened on to this yard, there was a defective gully. Immediately opposite the house door, on the other side of the yard, there was a stable; while in a corner of the same yard, and adjoining the house, there was a hand-flushed closet so imperfect that a stick is needed to help downward the excreta. The drain from this closet, I was told, passes close by the well."

This seems almost incredible to those who have not had personal experience of what may be done and permitted in "Rural Sanitary (!?) Districts." After this it is not surprising to come on the old and well-known phenomena of pit-privies, large, ill-constructed, and offensive, and the usual record that "occupiers of the houses have to get their privies emptied as best they can."

ON the screens in a gallery at the South Kensington Museum (near the rooms in which are the Chantry bequest pictures), hangs a collection of drawings which should be of interest to our readers, being sketches in Italy and France by Mr. Ambrose Poynter, architect, father of Mr. E. J. Poynter, R.A., by whom they are lent. These are not only good in themselves, but are otherwise interesting as representing the style of architectural sketching in the early part of the century. The pencil drawings, executed in peculiarly neat and careful outline, with a few touches of shadow to emphasise details, recall a style of architectural sketching which we have seen exemplified in other drawings by architects of the same period, though not all so good as these. It is not what young architects nowadays call an "artistic" style of drawing, but it has the merit of accuracy for it is a kind of sketching that must be

accurate or nothing), and must have furnished admirable training for eye and hand. Mr. Poynter had another style of sketching, in rather heavily-executed water-colour, with the limited palette of the period, but very effective, and his drawings of some bits of old Paris have a historical as well as an architectural interest. Mr. Poynter also sketched figures well, and the collection includes a number of little isolated studies of figures and costumes of the Paris of his day. The drawings are mostly of the period of 1819, when their author visited Italy, and 1840, when he was a good deal in France.

THE exhibition of Mr. Albert Goodwin's paintings and water-colours at the Fine Art Society's galleries may probably be chronicled as the most remarkable "one-man exhibition" there since the memorable one at which the best landscapes of Mr. Alfred Hunt were collected in the same rooms; and we are reminded of that exhibition, too, in another sense, by the variety of treatment and subject in landscape which Mr. Goodwin shows us. He is not one of those artists whose landscapes, however excellent, are always much the same in general tone and appearance, and can be recognised across the room. The works may be roughly grouped under three heads—architectural or city subjects; real (or real-looking) landscapes; and imaginary or ideal scenes. In this latter type of subject—one full of pitfalls—Mr. Goodwin has struck out a line of his own, and enlarged the borders of the art in his endeavours to realise to our sense of sight the scenes of the world of romance of the Arabian Nights, or the more sombre imaginings of Dante. The "City of Dis," seen not long since in the Royal Academy, was a great success of its kind, and we earnestly hope that Mr. Goodwin may feel moved to devote himself further to Dante, who has been little and for the most part badly illustrated, the task of realising his scenes requiring a special gift both of imagination and handling which Mr. Goodwin appears to possess. Several of the Arabian Night's scenes are in the collection, and will bear looking at again; there is also a remarkable conception of the Passage of the Red Sea, which we do not remember to have seen, and a very powerful picture of "Dives in Hell," a thing far from the commonplace conceptions of such subjects. Among the drawings of real scenes (executed in a perfectly different style) some of the most delightful are "Dorchester" and "Wells" (33, 34); "The Weir at Durham" (40), a moonlight effect; the Grand Canal and La Salute, Venice" (45), a beautiful bit of colour, the strong point of which is the bold treatment of the bright-coloured sails in the foreground; "Old Almshouses, Bray" (49); "West Harnham, Salisbury" (50); "Lago Lugano" (54), in which it is worth while to study especially the careful and minute treatment of the sunlit water after a manipulation of the artist's own; "Dorchester" again (80); and St. Mary Redcliffe, Bristol" (90), a very successful and beautiful night effect. There is something delicate and peculiar in Mr. Goodwin's treatment of city scenery, in which he reminds one in a way of Turner, but with more accuracy in general as to the architecture; the only criticism that may be made is that this delicacy and sparkle of effect is sometimes carried a little beyond truth; at all events we never saw picturesque but dirty Bristol look as clean and bright as she does in these drawings. From the small attendance at the rooms we presume that the general public have not even yet discovered Mr. Goodwin. It is somewhat amusing to find the room half empty for such a collection of work as this, when one may go to another gallery to see drawings by an unknown artist and find too great a crush to get in. There is some "management" about these things, apparently; a mystery to those who are not behind the scenes.

THE series of sketches on the Thames, from Oxford to Greenwich, by Mr. Max Ludby, now on view at Messrs. Dowdeswells, is a collection of very pretty drawings in true water-colour style, and worth looking at even after Thames scenery has been so much drawn as it has been of late years. Among the best are the views showing the charming old bridges of Dorchester and Shillington (10 and 13), "Near Wallingford" (15), "Goring" (18), "Maple-durham Hill" (24); "Sonning" (28), rather spoiled by the water—we might add, by comparison with Mr. Hunt's almost identical view; "Great Marlow" (43), "Bourne End Reach" (48), and "Richmond Bridge" (76). Two larger views from the Lambeth Shot Tower, looking east and west (83, 84), are interesting as from an unusual standpoint; St. Paul's, however, is not treated very well in the eastern view; but artists seldom do justice to this Cathedral.

THE annual conversazione of the Architectural Association, held in the rooms of the Royal Institute of Painters in Water-Colours, Piccadilly, on Friday evening, October 27, proved to be equal to former ones in arrangement and entertainment. A large number of guests accepted invitations, and they were received by the President, Mr. E. W. Mountford, F.R.I.B.A., and the committee. The pictures of the Society of Painters in Oil-Colours, which had been privately viewed in the afternoon, occupied the walls, and created much interest amongst the guests. An exhibition of admirable photographs, taken by Mr. J. L. Robinson during the annual excursion this year, was the only one which had an interest architecturally. The presence of the oil-pictures prevented the exhibition of the work of Association students, which usually forms an interesting feature of the evening. The band of the 1st Life Guards played a selection of music at intervals. It is reported that everyone received his own hat and coat on leaving.

LETTER FROM PARIS.

PARIS has been going through a series of fêtes which have been fine in their way, and leave far behind the ordinary and commonplace celebrations of July 14. Some of these fêtes have required an architectural decoration of which it is worth while to preserve some record. Let us commence with the Hôtel de Ville, which on October 19 and 20 was the scene of two splendid soirées. These entertainments have enabled us once more to appreciate the fact that MM. Ballu and Deperthes made a grave error in not reproducing in their design the fine glazed court which was so useful in the old building on the occasion of official fêtes, with its arched galleries and its splendid staircase, which in two revolutions mounted with graceful curves to the level of the ball-room. The new Louis XIV. Court, as to-day existing, open to the sky, and surrounded by glass doors, is poor in appearance and useless practically for an entertainment. The new Inspecteur Général of Architecture, M. Bouvard, who in the organisation of these festivities has shown that he possesses an admirable faculty for scenic mounting, endeavoured to repair Ballu's mistake by a temporary roof hidden by a richly decorative velarium, and by transforming the court thus covered into a kind of winter garden. But this is only a makeshift; and after the experience of this occasion the Municipal Council really ought to vote the money necessary to restore the "Cour d'Honneur" to its original purpose, and make it into a large covered hall such as is imperatively required on such occasions.

Before the principal façade of the Hôtel was a grand loggia built up in timber and painted cloth, occupying the whole length of the front enclosure. This large annex was the work of M. Carpezat, the decorator, and represented a range of semi-circular arches separated by pilasters the capitals of which supported an open balustrade, reproducing the design of that over the attic of the building itself. The effect produced by all this was not very satisfactory. In the case of a façade in a style so pure as that of the Hôtel de Ville (the central portion especially) the architecture should have been respected, and it would have

been far better, instead of tacking a piece of sham architecture on to it, to have had a simple tent richly decorated, the temporary nature of which would have been obvious and would not have interfered with the lines of the architecture. On the Place de l'Hôtel de Ville, in front of the building, rose two threemes, decorated with masts and banners, on which were the singers and the orchestra. It was easy to recognise, in these constructions based on a cloth painted to resemble the sea, the remains of the famous historic procession of the fête of September 22, 1892, on the bad taste of which we commented at the time. These sham vessels, surrounded by the admiring crowd of idlers, made a pitiable spectacle in this position, and reminded one of the swings seen at public fairs in some other countries. As a matter of decorative effect the four large pylons decorated with electric lustres and marine emblems, which were placed in front of the Opéra House, were far better. These, placed at the intersection of the Avenue de l'Opéra and the Boulevard, formed, along with the crowd of flags almost roofing over the place, a very fine piece of effect.

The fêtes have unfortunately occasioned some damage here and there. The groups of sculpture on the façade of the Opéra House suffered somewhat from the crowds which pressed round the building. The "Danse" of Carpeaux has specially suffered, and one of the figures of this celebrated group has been thoroughly spoiled. Immediate repair is called for, and there is even some talk of removing the original group and depositing in the Louvre, replacing it by a copy. This idea, however, receives no countenance from the architect of the building, who is energetically opposed to any such meddling with the work on the façade.*

It is not surprising that sculptures which have now been exposed for a good many years to the influence of the weather as well as to such occasional injury from crowds should begin to show signs of decay; but what is more serious or at least more startling is that the large allegorical painting by M. Weerts, inaugurated last year in the "Salle d'Honneur" of the Hôtel des Monnaies, shows serious decay owing to an almost insupportable carelessness on the part of the "Direction des Bâtimens Civils," which has been called upon to repair the mischief without delay.

Now that Paris has settled down again from her recent excitement, the question of the Exhibition of 1900 begins to be seriously taken up. The committee, which was specially charged to consider and decide the question of site, was to have met on October 26, but in consequence of the fêtes at Toulon the meeting was adjourned to November 6. It is probable that at that meeting the site will be definitely fixed, though the choice has to be formally ratified by the vote of the superior committee. It is understood that the discussion will be limited to three schemes, those which relate to Courbevoie, Auteuil, and Paris. It is probable that the Paris one will have the preference. Courbevoie has few supporters in consequence of the distance in the first place.

Also because the speculative purchases which were made as soon as the site was suggested will compel the expenditure of a heavy sum in expropriations. The Auteuil scheme, a very attractive one, which has zealous defenders among the members of the committee, will probably be more fully discussed, but it presents many difficulties. As in the case of Courbevoie, the question of distance comes in, and then there is the violent opposition of the "Société des Steeple-chases de France," which is the tenant of much land at Auteuil, and which is supported by the Municipal Council of Paris, naturally the irreconcilable enemy of all suburban projects for the Exhibition. It is backed up too by all the commercial public of Paris and by the Administration de l'Octroi, which desires at all costs to have the Exhibition held within the limits of the fortification lines. Under these circumstances it seems almost certain that the Exhibition will be held on the Champ de Mars, which is the only available site within the city.† But it is well understood that in that case we are not to have a mere reproduction of the 1889 Exhibition. Certain erections of the Champ de Mars will be ruthlessly demolished; others may be retained but their appearance will be modified. According to M. Picard, the Commissaire-Général for the Exhibition, the destruc-

tion of the Galerie des Machines is not to be thought of, it will be too useful for large fêtes; but its appearance can be masked; nor can the Eiffel Tower be touched, as it is the property of a Society which has a monopoly for twenty years; but it would be easy to modify the ungraceful aspect of the lower portion. As to the Central Dome and the 30-mètre gallery, they are already doomed. Possibly the "Palais des Beaux-Arts" and that "des Arts Libéraux" will be also removed, but nothing is yet decided about them, and nothing probably will be till after the result of the architectural competitions for the new buildings which will be instituted.

According to the scheme of M. Picard, the Esplanade des Invalides would become a kind of centre, surrounded by the Exhibition, instead of being an annexe as in 1889, and the main entrance to the Exhibition would be at the Palais de l'Industrie, from which the Esplanade would be reached by a great structure thrown across the Seine. This combination would have the advantage of making the Exhibition more central and facilitating the access to it for the public. There remains lastly the question of the means of transport, which the sub-committee is to take into consideration. It is evident that from this point of view the Paris site is notably deficient. It is to be hoped that if it has no other good result, the 1900 Exhibition will have the effect of solving this often-postponed problem, and that the Paris population—which becomes every year more dense—will at last, with the opening of the new century, enjoy adequate means of locomotion.

In connexion with this point it may be added that the works have been commenced for the new "Gare du Luxembourg," the terminus of the Sceaux railway. The tubular road is already nearly completed.

The former site of the Hippodrome of the Avenue de l'Alma is now occupied by a number of houses built on speculation, and now another public building of the same class is being demolished, the arena of the Rue Pergolèse, built a few years ago for the bull-fights which had no success in Paris. The cupola has already disappeared; and in a few weeks nothing will remain of this big erection, the construction of which cost an immense sum of money, and which will now be replaced by mansions and villas.

At the École des Beaux-Arts the jury of architecture, presided over by M. Ginain, has given its judgment on the competition of the students of the first class. After having examined the fifty-eight designs sent in, representing "Un Établissement Thermal, the jury have awarded the First Medal to M. Bluyens, pupil of MM. Gerhardt and Redon. The jury then proceeded to the examination of the sketch competition, of which the subject was "Un Jube," but among the forty-two sketches submitted they have only awarded two first and six second "mentions." The competition for the Fauvin d'Attainville prize has also been decided. The first prize for landscape is awarded to M. Godby, a pupil of M. Gérôme and M. Merson; the prize for historical painting is taken by M. Boisson, pupil of M. Gustave Moreau.

The Musée Galliera, the interior fittings of which are nearly completed, will probably be opened towards the end of December, and the municipal collections, now so badly housed at Auteuil, will before long be arranged in it.

M. Racinet, a well-known designer, who was both an able artist and a learned man of science, has died, at the age of sixty-eight. He had been connected for more than a quarter of a century with the house of Firmin Didot, and directed the publication of many important illustrative works issued by the firm—"Le Costume Historique," "L'Ornement Polychrome," "La Céramique Japonaise," &c. After having directed the necessary studies and researches for these works, M. Racinet himself put them into literary form and executed the engravings. He received the cross of the Legion of Honour in recognition of his modest and laborious services, and he has left as his record a splendid series of studies of the costumes of the ancient and medieval world, which are a valuable mine of information for students and artists.

"A. A." LYRIC CLUB.—This amateur musical society in connexion with the Architectural Association held its opening meeting on October 20th, at Coleman's Hotel, Covent Garden, and announces future meetings once a month up to May 4, with an extra (ladies') night in January. The club has got a very pretty title-plate for its tickets and correspondence.

NOTES AT THE BREWERS' EXHIBITION.

As we briefly stated last week, the fifteenth annual exhibition and market of machinery, appliances, and produce used by brewers and those engaged in allied trades, was opened on the 23rd ult. at the Agricultural Hall, Islington. Over 600 firms were represented, but comparatively few of the exhibits can come within the scope of this notice, inasmuch as the exhibition, in addition to the machinery shown of a strictly trade character, was largely devoted to the interests of restaurateurs and others. But like most exhibitions held at the Agricultural Hall, the Brewers' Exhibition included several objects of interest to our readers, and to these we shall briefly refer.

The Deimel Light Company, of 86, Gray's Inn-road, W.C., had a stall near the entrance of the exhibition, at which they exhibited a very good form of gas-lamp. The lamps are manufactured in two sizes, consuming six and nine and a-half feet per hour respectively, and the light which the burners give is, judging from those in use at the exhibition, a steady white light. The burner is placed under instead of over the flame, and is said not to carbonise or choke the passages, for the gases of consumption being free, there are no carbon deposits to clear away. The larger lamp, we were informed, gave a light equal to eighty-five candles. The same firm also show the Alcarazas Filter, which is manufactured on Pasteur's principle of anti-microbe filtration by specially-prepared porcelain, combined with a cooling receptacle.

Messrs. Le Grand & Sutcliffe, 125, Bunhill-row, E.C., exhibited, in the main hall, their well-known Abyssinian tube wells and pumps, as well as boring and other tools used in well-construction. The exhibit also included a specimen of the artesian tube well, for use where strata cannot be penetrated by the Abyssinian tube well.

Messrs. C. Isler & Co., of Bear-lane, Southwark, also had on view their improved apparatus for drilling artesian-bored tube wells, drill and percussion plant, and deep-well pumps.

At Stall 34, in the main hall, Mr. J. J. Cornish, of Walsingham, showed samples of some patent malt-kiln tiles, for malt-kiln floors. The tiles are made of cast iron, and are perforated with holes at equi-distance over the surface, thereby allowing heated air to pass through the malt evenly. No bolts or fastenings are required, the tiles, by resting in the channel iron joints, retaining their proper position. The joists are supported by cross girders, and under these are placed larger girders. It is claimed that the tiles give a uniform temperature for drying malt, &c., being good conductors of heat.

At the stall of Messrs. Briggs & Co., brewers' engineers, Burton-on-Trent, a sample was shown of a pumice-stone brick, manufactured by a German firm, Messrs. Hubaleck & Co. It is claimed that the bricks being porous, the penetrating mortar unites one to another, and forms a compact and solid wall which hardens more and more owing to the continuous passage of air into the brick, completing the binding process of hydraulic lime and silicic acid. The bricks are very light, and are said to dry quickly, but we should like some statistics as to their resistance to crushing tests.

Messrs. Coates & Everett, engineers, Tanner's Hill, S.E., exhibited a preparation known as "Furline," an anti-incrustator for steam boilers, domestic hot-water supplies, and for hot-water pipes generally. The preparation is stated to be perfectly harmless.

Messrs. Orluck & Co., engineers, Leadenhall-street, exhibited a model of the "Challenge" air propeller, which is manufactured by Messrs. Scott & Co., of Newton Heath. As may be known, the propeller has a suction at the end of its blades, in addition to the suction equal to its own diameter. It can be driven by electricity, steam, or hand.

At Stall 154, Messrs. Messer & Thorpe, of Quality-court, Chancery-lane, had on view their patent bucket fire-extinguisher, which consists of a covered receptacle containing a considerable quantity of water in which is submerged a number of telescopically-packed fire-buckets, which can be easily withdrawn full of water, and thus ready for use. The patent is simple, but possesses some good points.

Amongst other exhibitors in the main hall we may mention the Eagle Range and Foundry Company, of Regent-street, who showed their cooking ranges and fire-grates; and Messrs. J. Stott & Co., of Fleet-street, at whose stand were to be seen samples of their gas governors and burners.

* M. Garnier is quite right.—Ed.

† We cannot help saying that we think this will be a fatal mistake. With the 1889 Exhibition fresh in people's memories, another exhibition held on the same site, with part of the same buildings, and the same ugly Eiffel Tower in the middle of it, will infallibly produce the impression of a *rechauffé*. A new site would make it a new spectacle, and give it a new interest.—Ed.

Messrs. Bilbie, Hobson, & Co., of Queen Victoria-street, showed various forms of gas-engines, the electric lighting of the building being effected by one of their 50-h.p. Stockport gas-engines.

Amongst the architectural and engineering exhibits of drawings of breweries, &c., were those by Messrs. H. Stopes & Co., of Victoria-street, E.C.; Messrs. Arthur Kinder & Son, Lawrence Pountney-hill, E.C.; Mr. W. Bradford, 12, Regent-street (who showed his patent plastic maling floors and a cowl for malt-kilns), and Mr. C. Johnson, of Churchdown, Gloucester.

A good collection of gas and steam engines, pumps, &c., was brought together in the main hall, the following firms exhibiting:—The Griffin Engineering Co., Queen Victoria-street; Messrs. Glover & Hobson, St. James'-road, Old Kent-road; The Pulsometer Engineering Co., Nine Elms; W. H. Willcox & Co., Southwark-street; The Campbell Gas-Engine Co., Kingston, Halifax; Messrs. G. J. Worsam & Son, City-road; Messrs. Buckston & Thornley; Messrs. Tangyes, Limited, and Mr. E. S. Hindley.

Refrigerating plant was shown by several firms, amongst them being Messrs. J. & E. Hall, of Dartford; Messrs. H. Pontifex & Sons, and the Linde British Refrigerating Co., of 35, Queen Victoria-street.

Messrs. Caddy & Co., of Daybrook, near Nottingham, exhibited a furnace fitted up with their hollow chilled fire-bars, and a rocking arrangement for preventing the formation of clinkers. The rocking device consists of a lever which, when pressed, raises every alternate bar, and which can be used to move the bars longitudinally for about 3 in.

In the gallery, the Bostwick Gate and Shutter Company had on view their patent steel folding gates, and Messrs. Merryweather & Sons exhibited specimens of hose and fire extinguishing apparatus.

Messrs. O'Brien, Thomas & Co. showed samples of stoves and ranges, as well as malleable steel mats, and Messrs. W. Sugg & Co. exhibited apparatus for lighting, heating, cooking, and ventilating.

Messrs. Baird, Thompson & Co. were showing their patent gratuity ventilators, and their other well-known specialties; and among other exhibits in the gallery we may mention the samples of inlaid tile linoleum by Messrs. B. J. Preston and Messrs. D. Hembry & Co.; potteryware by Messrs. Boulton & Co.; an improved patent platform for window cleaning and painting, by Mr. W. A. Swain, of Luton; lifts and hoists by Messrs. Isaac Braithwaite & Son, and "The Little Samson" hot water heating apparatus by Mr. Sam Deards.

The Haskin Wood Vulcanizing Company, of Manchester, exhibited samples of wood which had been treated by their method. Wood is put into chambers into which air is introduced at a pressure of about 200 lbs. per square inch, and which is heated up to from 300 to 500 degrees, according to the nature of the wood; soft woods take about eight hours to prepare, and the harder woods take longer. It is claimed that the wood will not crack or warp after this treatment.

Mr. W. Peck Taylor, sanitary engineer and surveyor, exhibited a terra-cotta wind-guard, called the "Gordon," intended as a cure for smoky chimneys.

The exhibition, which is said to have been the most successful of those already held, closed last Saturday.

THE PHYSIC GARDEN, CHELSEA.—In a letter to a daily paper of the 28th ult., the Clerk and Solicitor of the Society of Apothecaries quite dissipates the rumour that was current last week. Mr. Upton says that the Society have no power to sell the garden (see our "Notes" of July 12 and 19, 1890), but have asked the Charity Commissioners to deal therewith—it being a "charitable trust." The Commissioners reserve their decision pending the issue of a report by the Gresham University Commission. Three years ago, when threatened with the loss of the garden for building, many of the inhabitants made formal protest against being deprived of the open space. We trust that the Commissioners will see their way to preserve the garden—more than three acres—for scientific and recreative purposes; it should be made the "Kew Gardens" of London.

A SANITARY VISIT TO HORNSEY.—On Saturday last a number of students of the Sanitary Institute visited the Sanitary Depot, disinfecting apparatus, refuse destructor, and fire station at Hornsey (where they saw a demonstration of the harnessing and sending off of a fire-engine in thirty seconds from the ringing of the alarm bell), then to the Isolation Hospital, concluding with a visit to the well-known museum.

LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon at the County Hall, Spring-gardens, Mr. John Hutton, Chairman, presiding.

Foreshore of the Thames.—The General Purposes Committee reported as follows with regard to the question of reclaiming the foreshore of the Thames:—

"On the 10th instant we reported that a communication had been received from the Poplar Board of Guardians suggesting that the Council should at once consider some scheme as that of reclaiming the foreshore of the Thames in order to provide work for the unemployed during the ensuing winter, the guardians being of opinion that work of this nature would provide useful and remunerative employment without entering into competition with other trades. The recommendation which we then submitted was that the Thames Conservancy Board should be urged to forthwith consider to what extent and in what manner such reclamation might be practicable. This recommendation was, by leave of the Council, withdrawn with a view to the Committee further considering the matter, having regard to the appointment of three members of the Council on the Thames Conservancy Board. We have had the matter again before us, and we think that although the Council has no power to carry out, either by itself or in conjunction with any other authority, a scheme such as that suggested by the Poplar Board of Guardians, the subject might properly be brought before the Thames Conservancy Board by the Council's representatives on that body, and with that object we recommend the Council to pass the following resolution:—

"That considering the great benefits which would result from the reclamation of the foreshore of the river Thames in the county of London (adjoining and opposite such land as is unoccupied and not used for wharves), from the point of view of the public health as well as of advantage to the navigation of the port of London, the Council urges the Thames Conservancy Board to consider whether a large additional income could not be made to accrue from such works, and in what manner such reclamation can be carried out, and that the Council's representatives on the Conservancy Board be asked to bring this resolution before that body and to report to the Council the result."

Mr. Arnold moved that the matter be referred back to the Committee. The duty of embanking the river ought to be retained in the hands of the Council. Besides, it was impossible, even if the resolution were passed, that the Thames Conservancy Board could, or would, move in the matter.

Mr. Holmes seconded the motion.

Mr. Beresford Hope said that the question of reconstituting the Thames Conservancy Board would be before Parliament next session, and the Council must take part in that reconstitution. The funds of the Board could not meet this claim upon them.

The discussion having been continued by several members, and Mr. Strong having replied on behalf of the Committee, the amendment was put, and rejected by 29 to 27, and the recommendation of the Committee was agreed to.

Insanitary Areas in St. Pancras.—The adjourned report of the Public Health and Housing Committee was as follows:—

"On the 5th of May, 1891, the Council resolved that certain areas in St. Pancras known as the Somers Town (Churchway and Weirs-passage) area, the Brantome-place area, and Prospect-terrace and Derry-street area, which had been represented by the medical officer of health of St. Pancras under Part I. of the Housing of the Working Classes Act, 1890, should properly be dealt with under Part II. of that Act. The Vestry dissented from this view, and petitioned the Home Secretary to arbitrate on the matter. An arbitrator was accordingly appointed, and a local inquiry held. At the inquiry the Vestry submitted a plan with respect to the Churchway area, which represented an area considerably larger than that which the Council's officers had hitherto considered had been represented. The Council's representatives were unable to accept the plan, and the inquiry was adjourned to enable the matter to be further considered. We thereupon viewed the area and conferred with members of the Vestry on the matter. As, however, we were unable to come to any satisfactory arrangement with the Vestry, the inquiry by the arbitrator was resumed on the 16th of February, 1893. The Council was ably represented by its solicitor's department. Mr. Corrie Grant appeared for the Vestry. A scheme for dealing with the most important of the areas, viz., the Churchway area, was submitted by the Vestry, which would have involved a net cost to the Council of about 200,000l., according to their valuation, which the Council's valuer considered much too low, with a displacement of 2,600 persons, re-housing only 1,800. The cost of dealing with the remaining areas was estimated at about 57,000l. It was admitted on both sides that the areas in question were insanitary, and that over-crowding of the area by houses, leading to want of proper air and light, was the chief cause of their insanitary condition. It

also appears to have been admitted by the Vestry, and the evidence is strongly confirmatory of the view, that not more than half the number of inhabitants displaced could satisfactorily be re-housed. This is the minimum required by the Act under Part I. It was stated on behalf of the Council that the Council might have favourably considered a scheme under Part I. for the Churchway area but for the re-housing difficulty, and provided the Vestry had seen fit to use Part II. for the other areas, leaving the question of the Council's contribution to be settled afterwards. On June 27 the Home Secretary's decision was received; it is as follows: "That so much as lies to the west of Chalton-street, but south of Drummond-street, excluding Christopher-place, should be dealt with by the County Council under Part I. of the Act." This deals with the greater part of the Churchway area. With regard to the rest of that area the decision is "that Christopher-place, and so much as lies to the west of Chalton-street but north of Drummond-street, should be dealt with by the Vestry under Part II. of the Act, without any contribution from the Council." That so much as lies to the east of Chalton-street should be dealt with by the Vestry under Part II. of the Act, the County Council contributing one-third of the expense. The Prospect-terrace and Derry-street area and the Brantome-place area are to be dealt with by the Vestry under Part II. of the Act, the County Council contributing one-half the expense. In order to give effect to the decision of the Home Secretary, the Council's Medical Officer thereupon took, in conjunction with the other officers, the necessary steps to prepare a scheme for the reconstruction of that part of the area which the Home Secretary had decided should be improved by the Council alone. This we now submit for the approval of the Council, together with the statutory resolution which it is necessary to pass under section 4 of the Act. There will be 1,266 persons displaced, and it is only possible to rehouse about 650. It is unfortunately impossible to find accommodation even in the vicinity for the 600 permanently displaced. The evidence at the inquiry showed this to be true, as an investigation was made within a mile radius of the area. The net cost of the scheme is estimated at 55,000l. In compliance with the Act and to safeguard the Council's interests, advertisements must be issued in three consecutive weeks in November. No claims for compensation are legally recognisable by the Council for any interest created in the area, after the date of these advertisements. It is therefore urgent that the necessary resolution should be passed in order that the advertisement may appear without delay. A year's delay must mean a much larger cost to the Council for compensation for new interests. We have written to the Vestry asking what action they are taking with regard to the other areas, but as yet have had no reply. With regard to the 600 persons who cannot be rehoused on the area, we are considering as to their occupations and condition, and will report further to the Council. We recommend—

"(a) That, subject to the necessary estimate being submitted by the Finance Committee, and as required by the statute, the requisite resolution under Section 4 of the Housing of the Working Classes Act, 1890, be passed by the Council, and that the seal of the Council be affixed thereto.

"(b) That the draft scheme submitted by the Committee for the improvement of the area referred to in the said resolution be approved, and that it be referred to the Council to complete the scheme and to take all the necessary steps for depositing and obtaining confirmation thereof."

Mr. Lloyd moved the following amendment:—

"1. That as Parliament has not up to the present time—by an improvement rate, a taxation of ground values, or rate other than that falling on the occupier—provided the Council with sufficient resources to carry out the scheme referred to in the official report sent to the medical officer, this Council is not satisfied (within the meaning of section 4 of the Housing of the Working Classes Act, 1890) of the sufficiency of its resources, and is at present prevented from passing any resolution that an improvement scheme for that area ought to be made or carried out. 2. That the owners of the ground values of the area—viz., the trustees of Earl Somers' and Lord Southampton's estates, and Lady Henry Somerset, the present life tenant—be informed of the representation of the medical officer, and that they be urged to take the necessary steps to put an end to the present condition of things, which is certified by the medical officer to be dangerous or injurious to the health of the inhabitants of the area."

He said that the Council was only halfway through the Bethnal Green scheme, which would cost 400,000l., and as a considerable portion of its old London wants rebuilding on account of its bad sanitary condition, a number of similar expensive schemes would be pressed upon them for adoption. The ratepayers were not the proper persons to bear the cost of putting the owners' decayed property into proper condition.

Alderman Fleming Williams seconded.

Mr. Beachcroft maintained that the only way they could tax the ground-landlords for the purpose of improving the condition of London was by insisting that when a house was insanitary and worn out it should be closed and demolished, and

when rebuilt it should be rebuilt on lines which would mean sanitary lines, a sufficient distance from the centre of the street and of no greater height than the width of the street.

In reply to Alderman Williams and Mr. Harben.

The Vice-Chairman stated that he believed no penalties would attach to the Council if they decided that they could not carry out the scheme owing to insufficiency of means.

After some further discussion the amendment was, on a show of hands, adopted by a large majority.

York-road Sewer, Lambeth.—The report of the Main Drainage Committee contained the following paragraph:—

"Certain comments having appeared in the public press on the subject of the report made by us to the Council on October 17 as to the completion and cost of the sewer in York-road, Lambeth, we deemed it advisable to ask the Engineer to report on the statements made. This report has been laid before us, and we now submit it for the information of the Council.—In my report of the 17th instant it will be remembered that I compared the result of the Council's operations with the lowest tender received and the Engineer's estimate as follows:—

Mr. Adams' tender	£11,588 16 6
Less provision money and for work not executed, calculated at Mr. Adams' prices	1,948 4 6
Net tender	£9,640 12 0
Engineer's estimate	£7,000 0 0
Less—as above—for provision money and for work not executed, calculated at Engineer's prices	1,608 10 4
Net estimate	£5,391 9 8

Actual cost of the work as executed by the Engineer's Department ... £5,163 3 9

As the amount of work executed was the same in quantity as that included in the tender and estimate, and based on quantities taken out by an independent quantity surveyor, the result shows that it has been done for 4,477l. 8s. 3d. below Mr. Adams' tender, and 227l. 5s. 11d. below the Engineer's estimate. The remarks in the press which are referred to me deal for the most part, not with Mr. Adams' tender, but with the other tenders sent in by Mr. James Dickson, the total of which was 11,608l. 4s. As I understand the articles, they claim on his behalf that if all the proper deductions in the tender but not executed by the Council, the result would prove that his tender was not much above the actual cost of the work. I have therefore deducted from Mr. Dickson's tender the provision money, 600l., and the same quantities of work not executed, as in the case of Mr. Adams' tender and the Engineer's estimate, but priced at Mr. Dickson's figures, from which it will be seen that they amount to 2,675l. 11s. 8d., compared with 1,948l. 4s. 6d. as the case of Mr. Adams. It will, however, be remembered that Mr. Dickson's tender was from the first informal, as in breach of clause No. 60 of the specification, he included an extra of 500l., over and above the 2,675l. 11s. 8d. already quoted for timber in the trenches which should have been included under the 2,675l. 11s. 8d. The Council did certainly leave in a small quantity of timber valued at 27l., but the total sum spent on timber for all purposes by the Council only amounted to 227l., and of this a good return was obtained (at the conclusion of the work) from the Works Department, and is included in the 140l. previously reported. Mr. Dickson would appear to have priced his timber for the whole trench at over double its cost price, and then to have assumed that it would all be buried in the trench. This item by itself gives a good idea of the mode adopted in making up Mr. Dickson's tender.

The best proof, however, that Mr. Dickson's prices were absurdly high can be given in another way. Last year was executed for the Council a sewer of the same size as that in York-road. It was situated in The Grove, Hammersmith, its length was 3,955 ft., and its cost 13,347l., or at the rate of 3l. 2s. 5d. per foot; whereas his tender for the York-road sewer was stated, after all deductions (3,175l. 11s. 8d.) made, at 5,432l. 12s. 4d., or 1753l. 11s. 8d., at the rate of 4l. 15s. 3d. per foot. Taking Mr. Adams' tender, less deductions (1,948l. 4s. 6d.) as above, 9,640l. 12s. for the same 1,763 ft., we get 5l. 9s. 4d. per foot, the actual cost to the Council being 5,163l. 3s. 9d. for 1,763 ft., or at the rate of 2l. 18s. 6d. per foot. It is clear from these and the preceding figures that the apparent difference between the actual cost of the work and the total amounts of Mr. Dickson's and Mr. Adams' tenders is due to the high prices at which they priced their tenders, and not to any other cause.

Mr. McDougall, the Chairman of the Committee, said they had got one of the best pieces of

work ever done in London, and it was quite certain that it had been executed for 4,500l. less than they would have been charged by a contractor.

Limit of Height of Buildings.—The Bridges Committee's reports on the progress of work at the southern approach, Blackwall Tunnel, and at Barking-road Bridge, having been received, the Building Act Committee brought up a special report on the question of the *Limit of Height of Buildings*. The following is the report:—

"The Council, on December 8, 1891, passed the following resolution:—That it be referred to the Building Act Committee to consider and report whether, with a view to preventing the increase of insanitary areas in London, it is desirable that effect should be given to the recommendations made in 1885 by the Royal Commissioners on the Housing of the Working Classes, with regard to limiting the height of dwelling houses according to the space about them, whether built on old or new foundations, and what amendments of the Building Acts are practicable in this direction." The Building Act Committee did not at that time see its way to recommend the Council to adopt any such amendment.

The Public Health and Housing Committee again called the attention of the Council to the matter in April, 1892. On April 19, 1893, the Building Act Committee, after several conferences with members of the Public Health and Housing Committee, brought before the Council certain recommendations dealing with the matter so far as to prevent existing buildings from being enlarged, or buildings raised anew upon old foundations from being erected in such a manner as to make matters worse than at present, so far as regards free access of light and air. These recommendations led to a long and interesting debate on June 13, 1893. The only objections urged against the recommendations of the committee were that they did not go far enough. An amendment incompatible with the recommendations of the committee was carried by the very narrow majority of 57 to 55, and ultimately the whole subject was referred back. A joint sub-committee of the two committees concerned was appointed and various proposals discussed, the great difficulty being to devise provisions which should effect the object in view without occasionally causing great hardship to individual owners. The representatives of the Public Health Committee did not object in the least to the Bill containing clauses to effect the objects aimed at in the proposed amendments rejected by the Council on the 13th June, 1893. It is not necessary at present to place these before the Council in the form of clauses, but we recommend—

"That the proposed bill to consolidate and amend the Acts relating to street and buildings in the county of London should contain clauses providing—

(a) That existing buildings should not be raised or extended so as to contravene the provisions of the bill as to height and open space in front, which are applicable to new buildings, or where they already contravene such provisions they should not be raised or extended so as to make matters worse.

The next recommendation should meet with no opposition. It is designed to meet a grave defect in the existing law whereby the Council has practically no control over such buildings as blocks of artisans' dwellings not fronting on any street but enclosed in a court-yard exclusively belonging to them.

(b) That domestic buildings not abutting upon any street shall be subject to the provisions as to height and open space about them similar, *mutatis mutandis*, to those which buildings abutting on streets are subject to.

As regards the crucial difficulty of setting back buildings in old streets or on old foundations, the only practicable proposal that we can make is that under such circumstances, unless the Council should be compulsorily, but that the owner should remain in possession of the land left vacant by such setting back. It would of course then remain open to the vestries to purchase such forecourts and throw them into the public way, thus settling the question of compensation to which the owners would seem to be reasonably entitled. By setting back the buildings all the requirements of health would be met. It seems reasonable to compel the owner to erect his new buildings of such a height and in such a manner as to prevent his buildings from being injurious to the health of their occupants, or the occupants of buildings opposite to them, and this without any compensation. But as regards the public convenience, there is no sufficient reason why the public should not pay a fair price for what it requires. We, therefore, recommend—

(c) That buildings erected upon old foundations or on old foundations shall, unless the Council otherwise allow, be subject to the same restrictions of height as new buildings erected upon new sites.

(d) That buildings erected upon old foundations, or erected in old streets shall, unless the Council otherwise allow, be set back at the same distance from the centre of the road as applies to new buildings erected on vacant land, but that in their case the owner shall not be compelled to give up to the public way the land so left free from buildings.

It may be remarked that in the case of the last two proposals the Council would, in parts of London exclusively devoted to business premises, use its powers of exemption somewhat generously. Whole streets or parts of streets might be dealt with

together. Some cases might be dealt with by compromise; thus, in Dash-street, chiefly devoted to business purposes, but in which there was not quite room enough for two vehicles to pass, A. B. & Co. desire to rebuild; clause (d) would compel them to set back twelve feet, but allow them to retain the space so left vacant as a forecourt; the Council might sanction a setting back of, say, four feet on the condition of the company surrendering the land. In all cases in which a discretionary power is given to the Council, it should have power to make such concessions as may seem desirable in any particular instance, and attach conditions thereto, which it should have power to enforce. It should be borne in mind that any restrictions upon building on old sites must tend to prolong unduly the life of old buildings, but this difficulty seems insuperable. The Committee could not recommend the Council to attempt to carry any provisions of a 'stronger' character than recommendation (d). There are four other matters which require dealing with, and we take this opportunity of asking the assent of the Council thereto. It is becoming more and more the practice to erect large blocks of buildings, the so-called 'mansions,' which entail certain peculiarities of construction; among others it is often found necessary to light many of their rooms by internal areas, or court-yards; these are often mere narrow shafts, quite inadequate to supply sufficient light and air, and are therefore most insanitary. Such shafts would be much less objectionable, if provided with adequate ventilation at or near their bases. We therefore recommend—

(e) That provision be made for the adequate ventilation of internal areas or shafts, constructed with a view to providing light and air to rooms in domestic buildings, and for regulating the dimensions of the same.

As the law at present stands, the Committee frequently finds itself in a difficulty as to new streets. Various clauses in the existing Acts indicate that the legislature intended the Council to have control over all new streets (e.g. 25 and 26 Vict., cap. 102, sec. 98; 45 Vict., cap. 24, sec. 7), but, as a matter of fact, many streets are laid out without the sanction of the Council. We recommend—

(f) That it should be an offence to lay out any new street without the sanction of the Council in writing.

It often happens that building owners are hampered in the laying out of their estates by the existence of old roads, paths, or rights-of-way. We are of opinion that it would be an advantage to the public that the Council in dealing with applications where this occurs should have powers, with proper safeguards, to close or divert such useless roads, paths, or rights-of-way, and therefore recommend—

(g) That in cases arising in the administration of the Building Act, the Council should have power, under proper safeguards, to close or divert useless roads, paths or rights-of-way.

Lastly, our attention has been called by the Vestry of St. Martin-in-the-Fields, Westminster, to the need for further powers of regulating gas-lamps overhanging public ways. These seem to grow daily of more formidable proportions, and in course of time by the action of the weather upon their metallic supports, they threaten to become a serious source of danger. We therefore recommend—

(h) That the Council be empowered to frame by-laws to regulate lamps, signs, or other structures overhanging public ways, such by-laws to be enforced by the vestries.

Dr. Langstaffe, the Chairman of the Committee, said that if the Council adopted the recommendations it would be a great help to them in dealing with insanitary areas.

Mr. Marsland moved the following amendment on recommendation b:—

"That the following words be added to recommendation (b):—'And that it be unlawful to erect buildings, other than domestic buildings, of such height or in such position in relation to existing domestic buildings existing prior to 1860, as to deprive the latter of the amount of light and air provided for by other clauses of the Bill.'

The amendment having been accepted,

Mr. Kanyard moved that recommendation c be referred back, as he thought it would have a tendency to cause owners to patch up their houses instead of rebuilding them.

Mr. Beresford Hope seconded.

The amendment having been put and lost, the whole of the recommendations were agreed to.

Electric Lighting of Victoria Embankment and Gardens, and of Westminster and Waterloo Bridges.—The following paragraph and recommendation in the Highways Committee's report was agreed to:—

"By section 20 of the London County Council (General Powers) Act, 1892, the Council is empowered to establish on or under certain land on the Victoria Embankment the works and buildings necessary for the electric lighting of the Embankment, &c.; and with the view of the works being commenced as early a date as practicable, we have directed the Engineer to proceed at once with the preparation of the plans, specification, and estimates. He states that it will be necessary for him to have temporary assistance for this purpose, and this we think should be afforded to him. We accordingly recommend—

That the Council do authorise the employment in the Engineer's department, for six months, at a salary not exceeding 3*l.* 1*s.* 6*d.* per week, of a temporary assistant upon its proposal in the proposed specification, and estimates and which shall be subject to the order of the Council for the Victoria Embankment and Gardens and the Westminster and Waterloo Bridges.

The Council adjourned at 7 o'clock.

Illustrations.

IONA CATHEDRAL.*

WITH the first thought of Iona is associated the name of Columba, but confining attention to the Cathedral, we realise how far back his time is as we learn that the main body of the present building, venerable as it appears, is of a date nearer to our own day than to the time of Columba. Yet of his period, 563-97, more is known by far than of the succeeding three centuries that are almost a blank in history—this holds not merely in regard of Iona, but of Scotland generally—and thereafter information about the island is very fragmentary. The earliest part of the Cathedral dates from the beginning of the thirteenth century, but the main body of the building is of the following century; the marks of additions and rebuildings are everywhere manifest, but the absence of almost all records gives only too much scope for conjecture as to causes and dates.

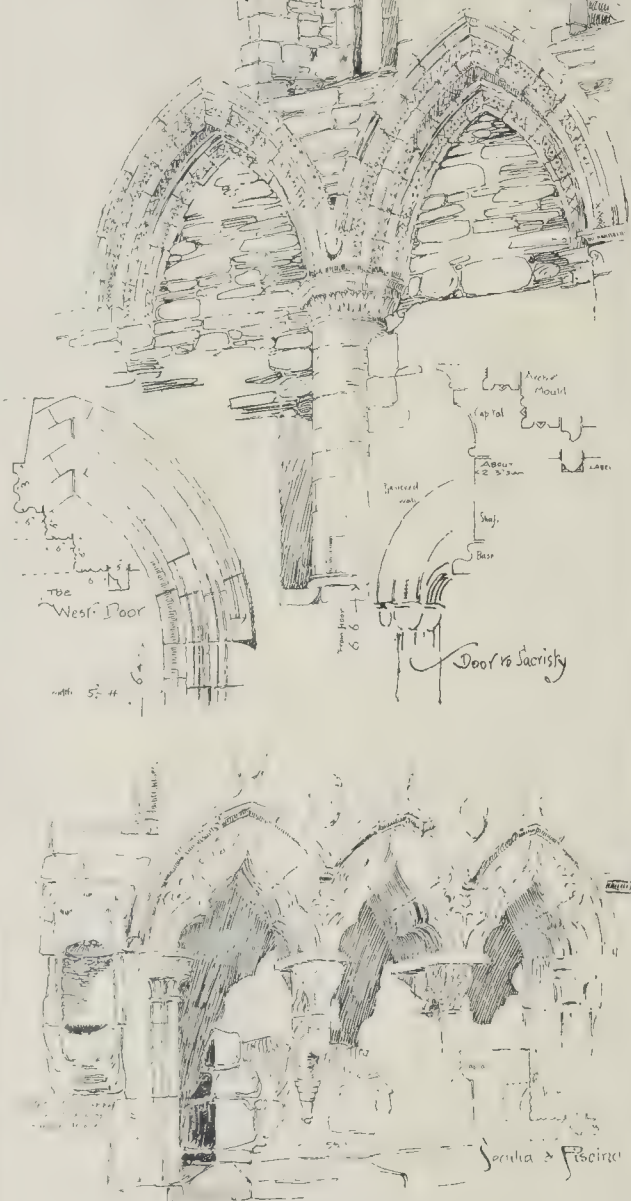
The name Iona is the modern survival of many designations—Icolumkill, isle of Columba, the most descriptive—but it is often met with abbreviated to Ii, Gaelic for island, or even Y. One of the smaller western islands, only some two and a-half miles long by about one mile broad, treeless, and exposed to the full fury of the Atlantic, it is yet by no means the bleak prison some have imagined. It is fertile and varied in contour, with shores of white sand—pulverised shells—that reach into the green water of the shallow sound; beyond is the blue ocean, and opposite are the red granite rocks of Mull, and still farther its magnificent mountains, all combining to give variety of interest and colour, and make Iona in itself delightful independently of historical associations.

At the time of Columba's landing in 563 the islanders were already partly Christian, and had been so for over one hundred years; the saint's royal connexion, it is believed, gained for him the gift of the island even before he expatriated himself from Ireland. Soon he was so secured in his settlement as to be able to leave it for long missionary tours so far afield as Aberdeen, Fife, and Dumfries, and even to Ireland. The type of settlement he founded was similar to that of the colleges of Ireland, a seminary for the rearing of itinerant preachers, the number of which varied with the fame of any teacher of special note; the houses were consequently of a temporary nature, little better than huts, their number easily increased as circumstances required; the chapel itself was but of wattle and thatch. Though architecture was thus rudimentary, the contemporary decorative arts, as is known, attained great excellence. For over a century the ecclesiastical status and ritual practice of Iona was peculiar; her abbots appear to have been subordinate to neither Pope nor Synod. In jurisdiction they were superior to the bishops, many of whom had no fixed diocese, following the tribes they ministered to. In 716 the community was prevailed upon to conform to the usage of the Western Church in regard to the time of observing Easter, and some other points.

The prosperity of the settlement was first broken in upon by marauding Norsemen, by whom, between 801-6, the island was utterly ravaged, and half of the community slain, only sixty-four lives being spared. Again, in 985, it was mercilessly raided, when the abbot and fifteen monks perished. 1070 is said to be the date of the cemetery chapel dedicated to St. Oran, a contemporary of Columba, and founded by Queen Margaret; the date is perhaps doubtful, but certainly this building is the most ancient architectural example on the island. It stands 100 yards south-west of the present Cathedral, and in all likelihood occupies the very site of Columba's first chapel of wattle-work. Surrounding it is the famous graveyard anastrophised by Dr. Johnson, and where

* The series of illustrations of the "Ancient Cathedrals of Scotland," which was begun in our issue of July 1 last, will be continued in the first number of each month, until March, 1894. In this, and of the series of "Cathedrals of England and Wales," which ended in June last, will be found on page 348. A short series of the "Ancient Cathedrals of Ireland" will follow the Scottish series.

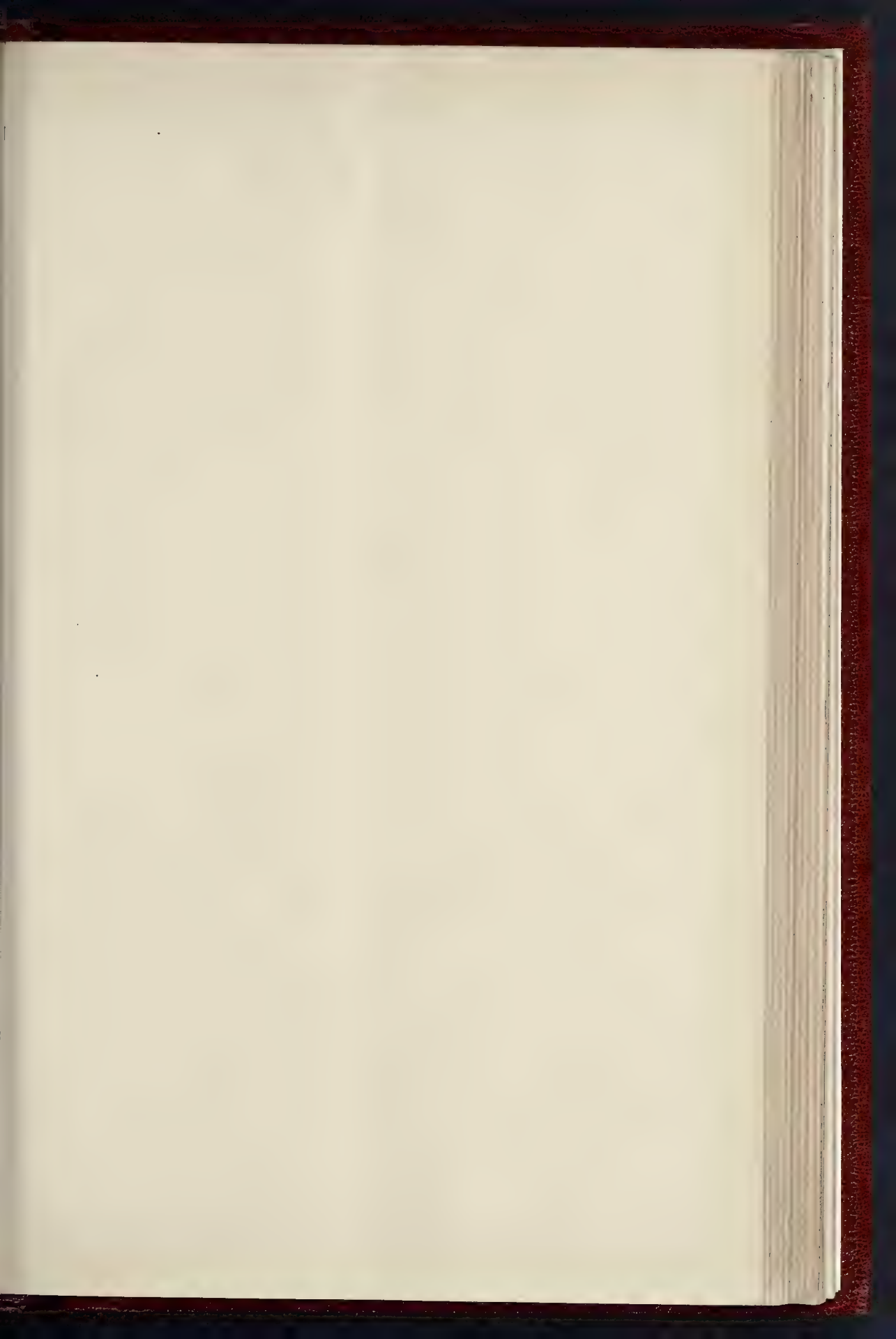
DOUBLE ARCH
(Built up)
"North wall of CHURCH"



Sketches in Iona Cathedral.—By Mr. Alexander McGibbon.

tradition says the Scottish kings from the fifth to the eleventh century, with many Irish and Norwegian kings, are interred. Shakspeare, in "Colmekill," refers to "the sacred storehouse" of Colmekill. About 1164-72 the monastery was attached to the Cluniac order; most likely the buildings then were substantial stone erections, though replaced now by the present ones. At that time Iona was the resort of many pilgrims, and had both fame and influence; so far distant

as Galloway it had dependences, for in 1172 mention is made of a church and chapel then transferred to the jurisdiction of Holyrood. In 1203 certain buildings were erected, but the founder transgressing ecclesiastical proprieties, they were removed; the interference of three Irish bishops in the matter shows the close connexion maintained between the Scottish and Irish churches. This may be the date of the earliest part of the present Cathedral buildings, i.e., the

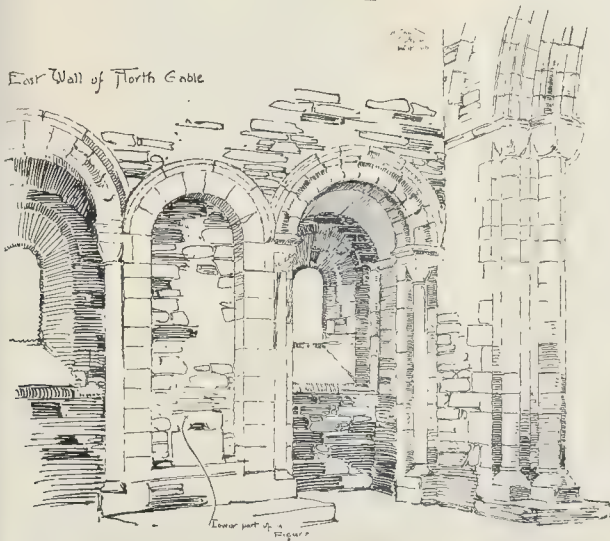
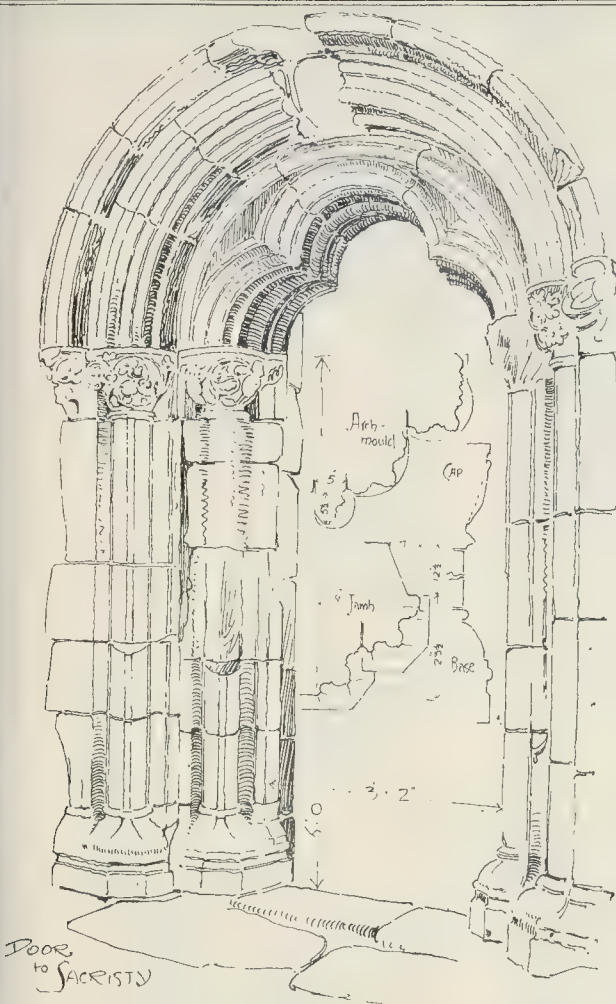




THE ANCIENT CATHEDRALS OF



1. SOUTH
—DRAWN BY MR. ALEXANDER MCGIBBON.

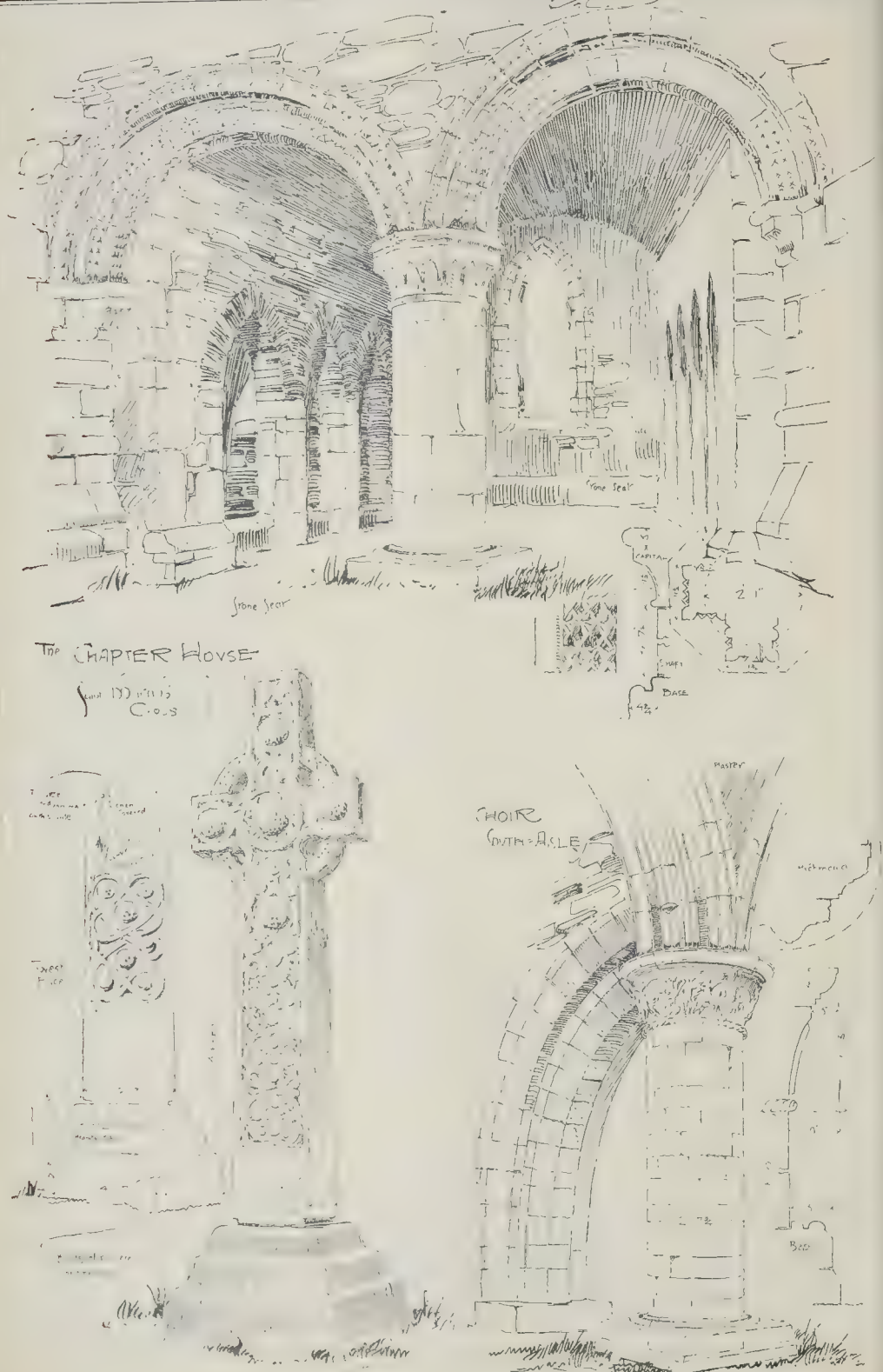


Sketches in Iona Cathedral. — By Mr. Alexander M. Gibbon.

north transept, north walls of nave and choir, the piers of tower, and the Chapter-house. Very possibly the original dimensions are preserved in the later alterations, the nave always small, because of the number of the laity being limited. The tower on plan is not a true square, being less in width, east and west, by some 5 ft.; what the projection of the south transept at first was is not known; in the nave was a north door, now built up. The refectory, of a date subsequent to these, has a fine doorway at its south-west end, partly built into when the later cloister was added. Later still, in the fourteenth century, the nave, choir, and south transept were almost wholly rebuilt, and the tower completed, at which time the monastic buildings, as at present existing, may have been built; and thereafter the choir S. aisle was rebuilt, the cloister formed, and a narrower arch introduced between N. transept and crossing. This was the completion of the edifice, some two centuries after its beginning.

There is considerable similarity between the double arch at the Chapter-house and that one so strangely elevated in the N. wall of the choir. The Chapter-house arch occupies a peculiar position; it can hardly have been its west termination, unless only a curtain was considered sufficient screen between the apartment and the vestibule or passage; later the Chapter-house appears to have extended to the line of the cloister. The piers along the side walls of the earlier part are required to support the barrel vault, added when an apartment overhead was formed—conjectured to be the library—but they have proved insufficient, and the south wall, notwithstanding the large buttress outside, is considerably out of perpendicular. The cause of the other double arch in the choir being 6 ft. 6 in. above the floor is equally hard to account for, if this is its original position; but it probably is a re-erection, though where from is uncertain. What its later purpose can have been is dubious; possibly it formed an opening between the choir and a chapel above the sacristy, this sacristy being a couple of steps lower than the choir floor and ceiled at a low level. It has three small windows and a piscina; above in the walls of the chapel (?) are also windows, the east one having a straight-sided arch top. The sacristy is apparently part of what has been intended as a north aisle, a couple of feet narrower than the south one, but extending, like it, to the transept, a raking weather course proving the intention, at least, though it may never have been executed; if it was, one of the windows of the north-chapel transept must have been blinded. The south aisle lacks the three-roll finish at its outer angle that the north aisle has, in common with all the buttresses and tower upper stage, and would thus seem to be of later date. The half arches there clearly have been formed after the columns were in position, and abut clumsily against the arch-mould; these flying buttresses, as practically they are, do not seem to have been required structurally. The socketting of the columns into their bases is peculiar; the carving of their capitals is very spirited, having as subjects Eden, the Expulsion, Rite of Sacrifice, Last Judgment, &c. The capitals of the half-column responds are later, with floral pattern, while the square responds have no caps at all. The east window of the aisle has tracery filling up most of its opening; its cill is so low that it appears improbable that any altar was placed in front of it, but rather against the north wall; this seems confirmed by the pavement. The stair to the tower was originally intended to be entered from the nave, but by 1600 that part of the building had so fallen into ruin that it was cut off, and the other entrance formed from the crossing, with a small enclosure added. Because of this turret-stair the south archway is narrowed, but that to the north transept is narrower still by a late insertion of new jambs; why is unknown, for no sign can be seen of any failure in the earlier arch. At the north-west corner of the crossing is a water stoup, probably taken from the north door when it was built up.

Just north of the western doorway is a curious small chamber, for the porter it is thought, as a small eyelet window overlooks the entrance; and yet of all cathedrals Iona seems least likely to have required such supervision of casual visitors; one might almost think of it as a chapel in connexion with Columba's cell and grave just beneath it. The floor of this chamber is some 7 ft. above the nave floor: the space under is only in part utilised by an ambry opening to the cloister. How this western projection terminated does not appear; it can hardly have assumed the importance of a tower, for in part it was covered by the



Sketches in Iona Cathedral. By Mr. Alexander M. Gibbon.



THE BUILDER NOVEMBER 4 1893

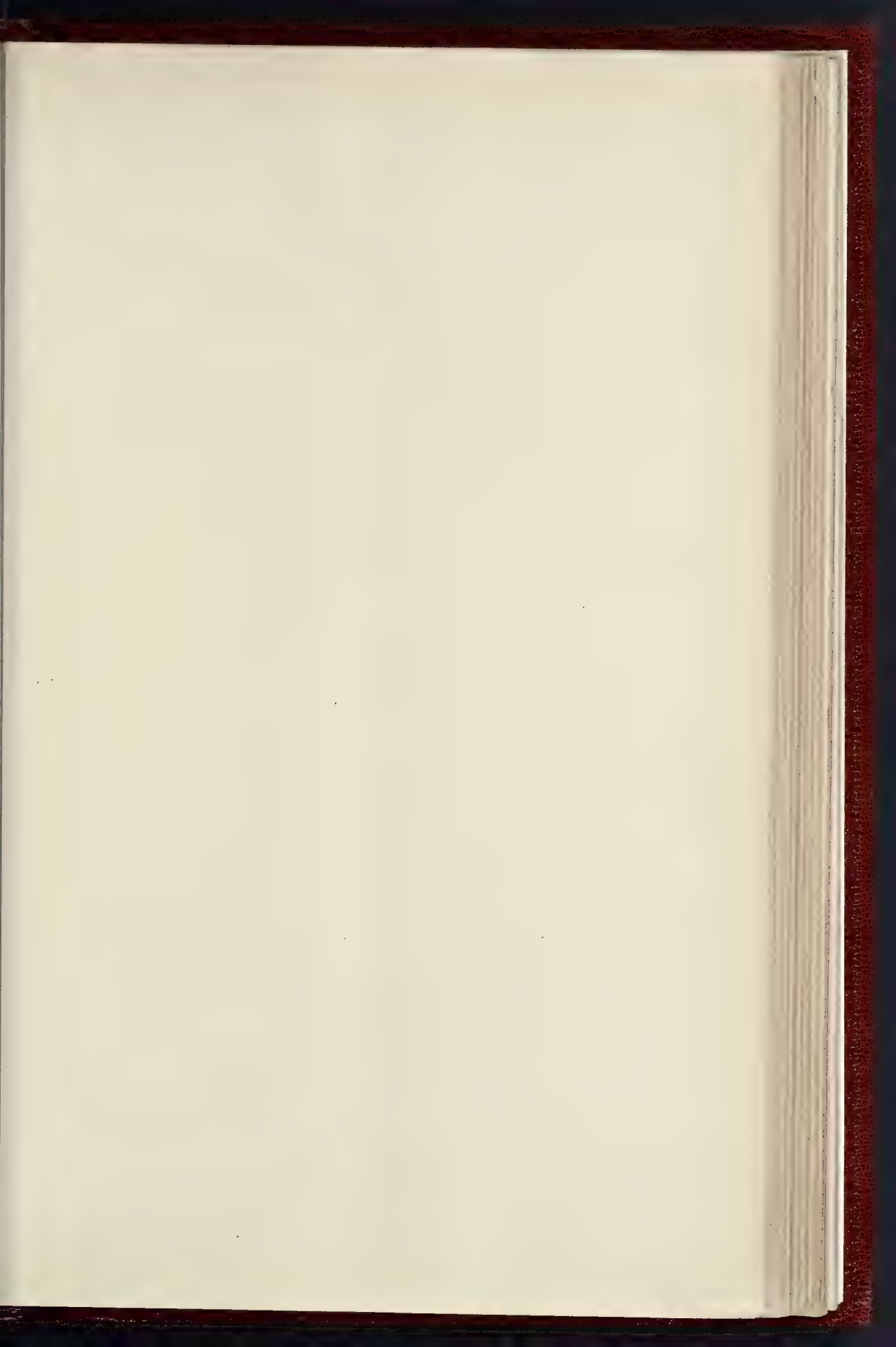




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DESIGN FOR ST ANDREW'S CHURCH AYR MESSRS MORRIS & HUNTLE ARCHITECTS

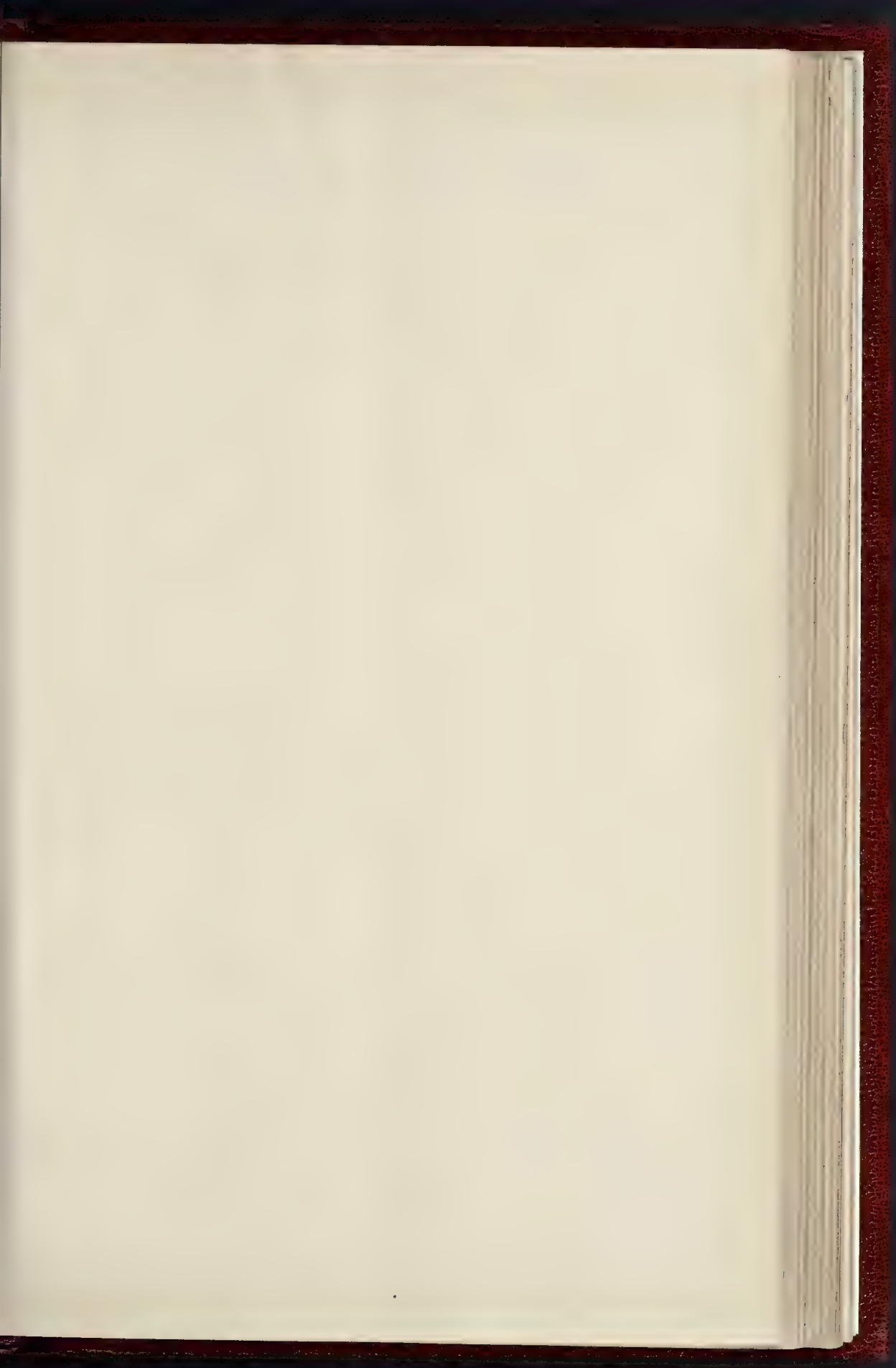
Royal Academy Exhibition, 1893





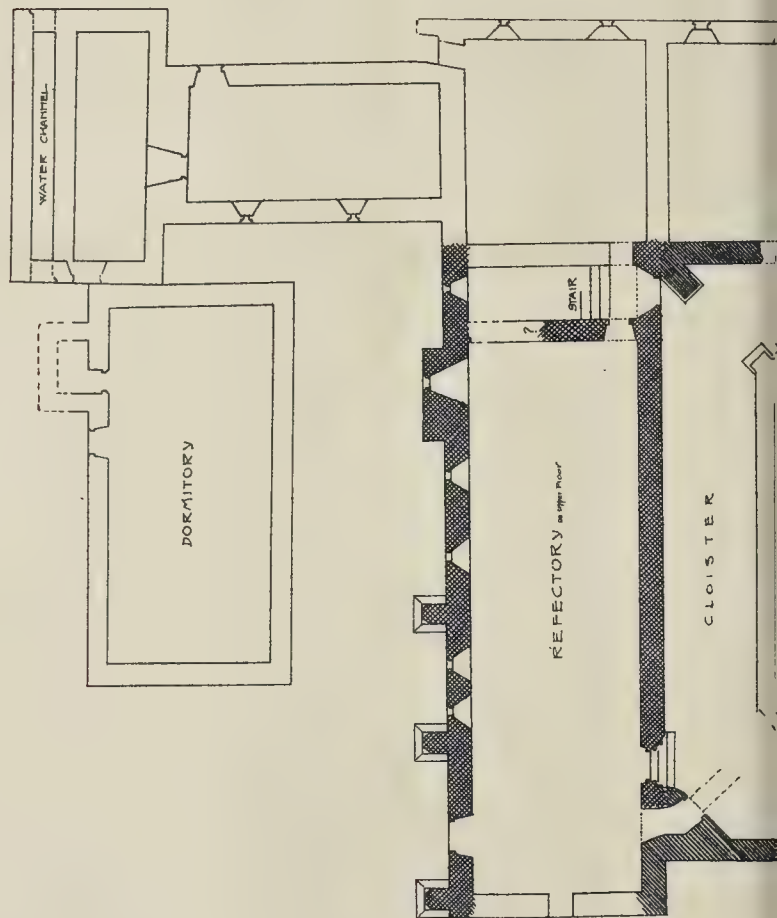
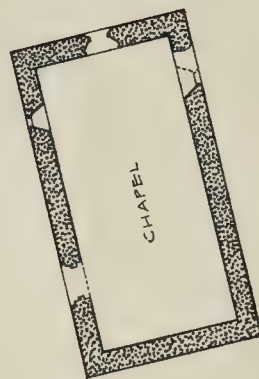
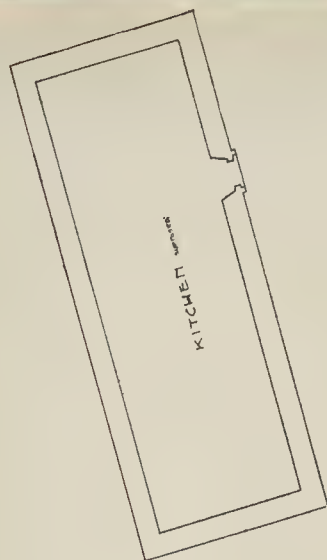
APSE WINDOWS HILLHEAD ESTABLISHED CHURCH, GLASGOW BY MESSRS SHRIGLEY & HUNT

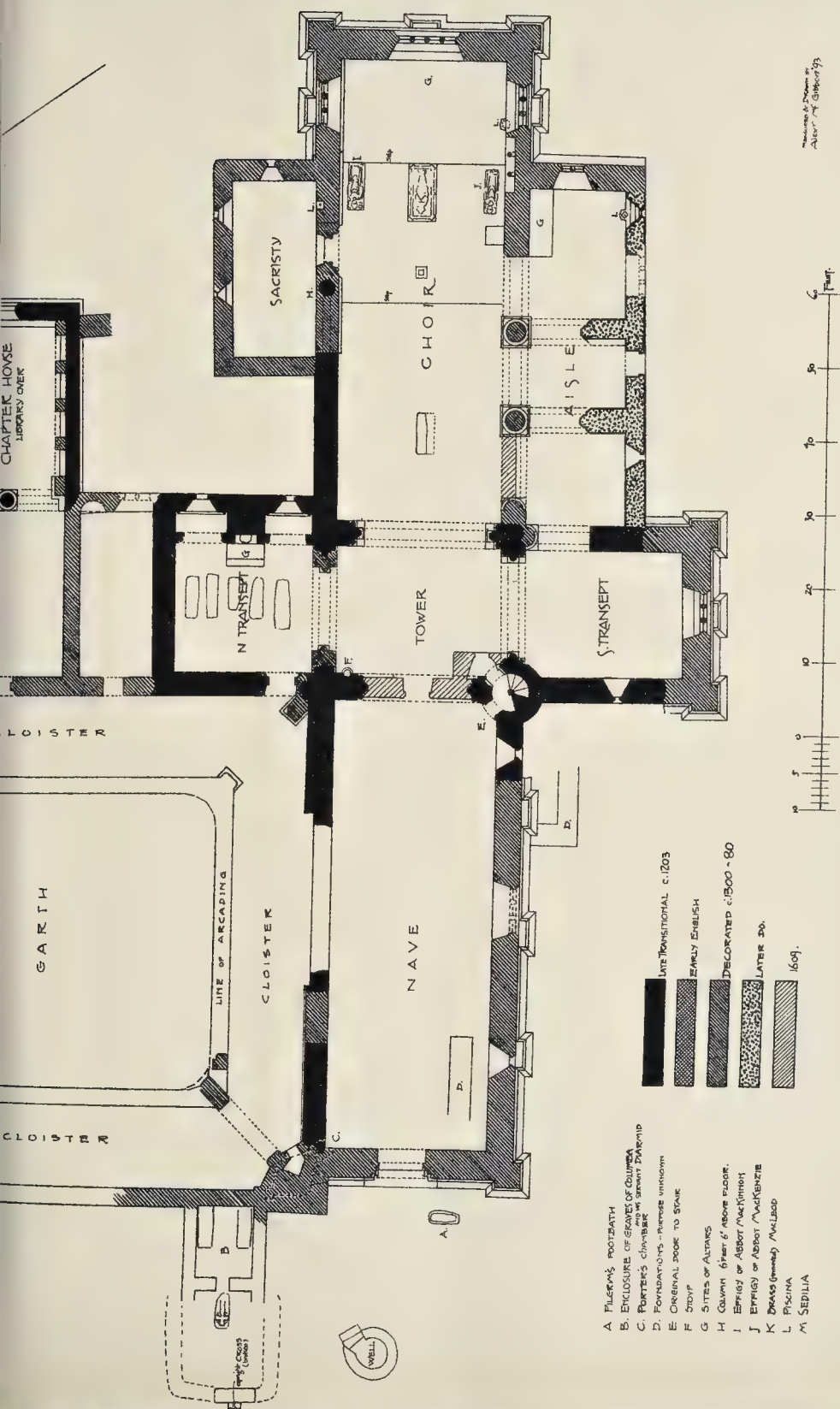


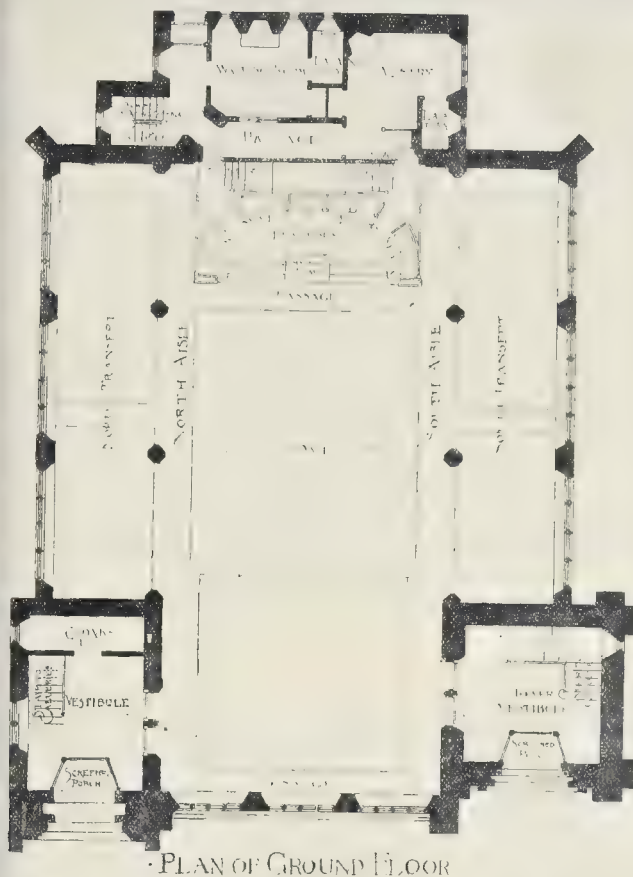


THE BUILDER. NOVEMBER 4, 1893.

IONA CATHEDRAL







PLAN OF GROUND FLOOR

Design for St. Andrew's Church, Argyll.

moister roofs, above which emerged the diagonal stone wall that had a channel formed on its sloping cope to carry off the water from the nave roof. Note may here be made of the fragmentary foundations that appear within the nave and also south of its outside; their purpose is unknown. The west doorway is very plain; the easternmost nave window is old; one similar, and a larger one of three lights, belong to the period of the rebuilding. The same splayed base, buttresses at corners with rolls on their angles, and small buttresses rising but a few feet above the base, are common to nave, south transept, and choir. The base stops abruptly where the east end of the nave it meets the older walling, and recommences at the transept with the new gable. When built that gable would seem to have been shifted a couple of feet south of its former site. The window there and at the east end of the choir has the peculiarity that the outer jamb mouldings return along the sill instead of, as customary, dying into the splay. The date of the cloister arcading and angle arches is difficult to fix; only a fragment of each remains; their character is Transitional and similar to that of the Chapter-house arch, but a later date must be assigned to their erection as one notes how at the north the angle arches encroach on pre-existing work. In the Chapter-house are preserved all the fragments collected, and among them are certain valuable capitals that seem to belong to the cloister arcading; some short stone pillars, too, with niches for socketting into the base, may likewise be ascribed to that part. The foundations that alone remain show no trace of any doorway to the north. The small apartment between the transept and Chapter-house, that has the only fire-place of the whole building, may have been the abbot's

parlour; it occupies the usual position of the slype. The refectory has been a fine apartment, the ground story used for cellarsage possibly, as it is low-ceiled, and the windows look to the north only. The upper floor is reached by a stair at the east end, notable as straight and of ample width. The fact that the door to that stair is plain than the west one, may warrant the conclusion that the former must somehow have given access to the refectory, though the connexion is now destroyed. The arrangement of the later door by its side seems to have been necessitated by disinclination to utterly spoil the finer one when the cloister was built; had the angle arch run into the corner, as at the east side, no room would have been left to get in a new entrance to the stores, as is attained by the method adopted; and though a chamber above the through passage is obtained and balances the porter's one, it hardly seems as if it were to gain such an apartment that the corner projection was made.

The purposes of the other buildings cannot now very well be identified, with their walls but a few feet above the ground. The most northerly one has a built channel through which passed the little stream that yet runs by; here may have been the lavatory. There are traces of a projecting chamber from the large apartment alongside, possibly also a lavatory of a dormitory. None of the rooms appear to have been the kitchen; the large detached north-west building is commonly so described, yet it has no evidence of a fireplace. The fact of this building being at an angle with the others, and about parallel with the detached chapel, may be noted, but no explanation is known. This little chantry chapel appears to be of fifteenth-century date; the entrance is from the north. Some fifty yards east

of it is a mere fragment of the bishop's house that was in occupation until 1688. The choir and transept roof parapets are supported on irregularly-sized corbels, and instead of the usual gargoyles to carry off the water, there is a row of small apertures, each formed of three projecting thin stones. The tower rises to a height of 75 ft.; its corner rolls terminate at the top in masks; on three sides are square panels of tracery, the filling is close to the outer surface; within, a baluster shaft—that may belong to an earlier date—supports a flat arch; on the north side of the tower is a double light under a pointed arch of more ordinary form. The small arrow-lets above are all widely splayed inwardly, so that apparently light to the interior was desired; the west one on the south face is more elaborate. There have been two stories in the tower; the crossing was never vaulted, and the turret stair goes no higher than the first floor; as for the form the tower roof took there is no evidence to show.

What renders it difficult to fix the period of the various rebuildings the edifice has undergone, is that the body of the walling is of large untoolled blocks of red Mull granite, the interstices packed with small stones. Obviously with such materials, rebuildings and junctions cannot easily be detected. The dressings are of grey sandstone. Throughout there is apparent a fondness for carved figures: at the apex and as the label-stop of nearly every window they appear, and at the sedilia. The choir is still partly paved with squares of sandstone; there are two steppings, and about the centre of the first is a socket as if for a rood. Built against the south wall is an erection that might pass as the base of a pulpit, or for an altar, only it is too high for that; the date would appear to be seventeenth century. There are two effigies in the choir of Abbots; Abbot Mackinnon, the last, who died 1500, and Abbot Mackenzie; both well carved. Near these is an upright slab, with a rudely cut figure of MacLean of Ross. The floor slab is a very large one, commemorating MacLeod of MacLeod; the brass, of course, has all disappeared. In the south aisle is preserved a slab elaborately incised with the figures of one MacIan and his sister; the date is 1500. There is yet one slab in the body of the choir, and several in the north transept; all have Celtic ornamentation. The High Altar, of white and grey marbles possibly local—existing entire towards the end of the seventeenth century, was by 1762 almost wholly pilfered away. At the enclosure which marks Columba's grave are several carved stones, and an upright cross dedicated to St. John; another to St. Matthew is distant a few yards, but both are broken and imperfect. The complete one is the well-known St. Martin of Tours Cross—fourth century—of mica schist, with a pedestal of red granite; its west face is almost completely covered with lichen. This cross and another older one, MacLean's, are the only representatives of the 360 said to have once adorned the island. Opposite the west door is the well, and by the side of the entrance is a granite trough, surmised to be a foot-bath for pilgrims.

The ecclesiastical annals of the Cathedral are brief. In 1226 Simon, Bishop of the Isles, was also Abbot of Iona—Lord Abbot is the title a few years later. The monastery over which he ruled was included in the diocese of Dunkeld; it was connected, too, with the Clunaic Abbey of Paisley, and had the powerful protection of the Lords of the Isles. In 1492 the Abbey was merged in the cathedral seat of the Bishopric of the Isles, a diocese founded in the ninth century, but joined to the Bishopric of Man in 1098, when, by Norwegian invasion, the western isles became subject to the Scandinavian hierarchy centred in Drontheim, and so remained for four centuries. The new order did not continue long, for in 1561 the act was passed suppressing all abbeys of monks, so the cathedral was vacated and its fine library dispersed. Yet there does not appear to have been any great mutilation of the fabric; it was simply disused, and so fell to decay. About 1609, under the Protestant episcopate, its fortune revived: the nave, as most ruined, was screened off, and the south aisle too; thus curtailed the church was in use until the beginning of last century. Now every vestige of woodwork in roof and furniture has quite disappeared, and there does not seem to be any record even of their design. The proprietor of Iona, the Duke of Argyll, about a dozen years ago, expended a considerable sum in clearing away the accumulated rubbish, replacing mullions, &c., and carefully collecting together all fragments. He is also the author of the best account of the Iona of Columba's time. The present buildings are

dealt with in "The Cathedral of Iona, by the Bishop of Argyll, 1866;" the architectural drawings and notes are by the Messrs. Duckler, of Oxford, but as they were prepared in 1847, subsequent clearings go to modify some of their views. There is very little information given in Billings, and there are inaccuracies in his plates—e.g., the pillar in the choir (north wall) is shown octagonal. Descriptions of the edifice by two visitors, Dean Munro in 1549 and Pennant in 1769, may be mentioned. The ecclesiastical succession is dealt with in Keith's "Scottish Bishops, 1824."

DESIGN FOR ST. ANDREW'S CHURCH, AYR.

THIS design, the ground plan of which is appended, was one submitted in competition for St. Andrew's Free Church, Ayr, and afterwards accepted for exhibition in the Architectural Room of the Royal Academy.

The design was intended to be carried out in Ballochmyle red sandstone, the internal dressings were to be executed in the same material. The roofing was to be of green slate. The cost, exclusive of the upper part of the tower and spire, was to be within 4,000/. The design is by Messrs. Morris & Hunter, architects, of London and Ayr.

STAINED-GLASS WINDOWS: HILLHEAD CHURCH, GLASGOW.

THIS window occupies the central position in the apsidal east end. The principal subject is Christ before Pilate, and in the upper part are figures of the four major Prophets, with texts from their writings foretelling Our Lord's Passion. In the base are the arms of the donor and the City of Glasgow respectively.

ST. JOHN'S CHURCH, SILVERDALE, WEST WINDSOR.

This cartoon forms a portion of a three-light window, in which the subject of the Nativity is treated in two tiers of panels. The group of the Holy Mother bending over the manger of the Infant Christ occupies the upper part of the centre light. In the two outer lights are groups of adoring angels, and in the three lower compartments angels lead in the Shepherds and the Wise Men.

The windows are by Messrs. Shrigley & Hunt, and the drawings were exhibited at this year's Royal Academy.

ARCHITECTURAL SOCIETIES.

GLASGOW INSTITUTE OF ARCHITECTS.—The first meeting of the newly-elected Council of this Institute was held in the chambers of Messrs. MacLean, Fyfe & MacLean on the 23rd ult., when the office-bearers for the coming year were elected, as follows:—President, W. Forrest Salmon; vice-President, T. L. Watson; auditor, David Thomson; treasurer, Alexander Petrie; secretary, C. J. MacLean; members of Council, W. F. Salmon, T. L. Watson, Alexander Petrie, Alexander Skirving, Henry E. Clifford, John Keppie, John A. Campbell, John B. Wilson, James M. Monro, A. G. Thomson, John Thomson. The committees for the year were also appointed, and other business of a formal nature transacted.

THE GLASGOW SCHOOL OF ART.—The initiatory lecture of a series upon "Italian Renaissance Architecture" was delivered in the Corporation Galleries, Glasgow, on the 25th ult., by Mr. W. J. Anderson, A.R.I.B.A. Mr. W. Forrest Salmon, F.R.I.B.A., occupied the chair. The lecture had for its purpose a review of the architecture of Italy from the earliest times to the end of the Roman Empire.

ENGINEERING SOCIETIES.

LIVERPOOL ENGINEERING SOCIETY.—The first meeting of the Liverpool Engineering Society for the twentieth session was held on the 25th ult., when the inaugural address was delivered by the newly-elected President, Mr. H. Percy Boulnois, M.Inst.C.E., City Engineer of Liverpool. After thanking the Society for electing him as their President, Mr. Boulnois explained why he had chosen the subject of Municipal Engineering for the purposes of his address. He pointed out that this branch of the profession did not exist sixty years ago, and that the Corporation of Liverpool, in the year 1846, had first legalised the position of the Borough Engineer, which was followed by the legislature of the country in the Public Health Act, 1848. The President then proceeded to point out the

early struggles of the municipal surveyor when he suffered from what he (the President) styled "the cheeseparing economies of a frozen community." He drew a picture of the want of sanitation fifty years ago, when there was little or no sewerage of any kind, and cesspools honeycombed the earth, and pointed out that all this had been changed mainly through the work of the municipal surveyor. The President then explained the various duties of a municipal surveyor under such heads as "Sewerage and its Different Systems," "Prevention of Floods," "Water Supply," "Roadmaking," "Tramways," "Street Lighting," and also the municipal surveyor's duties under the head of "Architecture," including that of building surveyor, and his miscellaneous duties, including legal knowledge, surveying, and administrative work generally, and the President said that he did not think he had exaggerated the work which a municipal surveyor is expected to know and perform, but, on the contrary, there were several subjects which he had purposely omitted. For instance, in some towns he stated that the municipal surveyor is also sanitary inspector and gas works manager, and in others he is chief rate collector as well as captain of the fire brigade. In conclusion, he said that, as knowledge brings new factors into play, and as they are applied by engineering skill, so human labour is more and more emancipated from the drudgery of the past, the forces of nature are put into requisition to relieve muscular toil, and mind more than ever triumphs over matter. He acknowledged, however, that a great deal still remains to be done in the future, and instanced a great many subjects in connexion with his own branch of the profession that were still unsolved problems.—On the motion of Mr. Robert E. Johnston, seconded by Professor Hele Shaw, a vote of thanks was passed to the President for his address.

Books.

The Cathedral Church of Manchester: Dedicated to St. Mary, St. George, and St. Denys. With illustrations. By J. S. CROWTHER. Manchester: J. E. Cornish. 1893.

THIS is the monograph on Manchester Cathedral, on which the late Mr. Crowther had been long engaged, and which he unhappily did not live to see published. That the author attached a great deal of importance to the work we had reason to learn at the time when we published the view and plan of the cathedral in the course of our series of "Cathedrals of England and Wales," a publication which Mr. Crowther, we regret to say, did all he could to prevent, apparently considering all illustrations of the Cathedral as his own personal right; a view which we naturally could not share, and which the Dean and Chapter, after no little discussion, declined to adopt.

Mr. Crowther proceeded in investigating the history of the church mainly by the evidence of the building itself, and found reason, he says, to believe that there was a stone church dedicated to St. Mary on the same site in Saxon times. The only reason we find adduced for this is the fragment of the carving representing an angel with a scroll, discovered in 1871 in taking down the south porch of the Cathedral. Mr. Crowther considered that the character of the writing resembled that of Anglo-Saxon of the seventh or eighth century. Judging from the drawing given, the carving of the figure seems more advanced than we should have expected from Anglo-Saxon work. The author notes that antiquaries were agreed that the subject was the Annunciation, and that if the rest of the slab were discovered the kneeling figure of the Virgin would be found on it, but though search was made for the missing piece during the work it has never been found. No opinion in favour of the Saxon date of the stone is quoted. It is a curious thing that not a single fragment of Norman work has been found in the edifice, whence Mr. Crowther's conclusion was that it was so strongly built of stone in the Saxon period that it had required no repair or rebuilding until the building of the church of the Decorated period, of which remains exist. This seems very improbable, because, as every one knows, the mere fact of a church being in good repair would have been no motive for later Medieval builders to spare it, when they thought they could build a better one. This stone is all the evidence for the existence of a Saxon stone church that is given, and (on the basis of the drawing) we feel decidedly sceptical about it. The church is mentioned in Domesday,

so it existed then, as a church of St. Mary, whether on the same site or not, but there is a tradition that this church was of timber (we referred to this in our account at the time of illustrating the cathedral, April 1 of this year); and if so, and it were left during the Norman period, that would account for there being no Norman work found, though we question whether the Normans would have allowed a timber church to remain on an important site, as Manchester already was. In short, Mr. Crowther's Saxon edifice rests on one stone. If that stone is really Saxon, it proves, or indicates, a good deal. But is it?

When we come to the history and illustration of the existing Perpendicular church, nothing could be better in the way of a monograph than this. Mr. Crowther had an old fame as the producer of beautiful and accurate drawings of Medieval work in the days of "Churches of the Middle Ages," a monumental work of which we fear many of the younger students of this generation do not even know the name. He took care that the old reputation should be kept up in this respect. The plan, elevations, and sections are drawn with most minute finish and accuracy; there are separate drawings of one bay of the choir and one of the nave, of the principal window tracery designs, and of a host of minor details. The mouldings of course are poor; that was to be expected; but in the main the book goes to show that there is more of architectural refinement and interest in Manchester Cathedral than is commonly supposed out of Manchester. The perspective view, which closes the list of plates, is neat but somewhat hard and mechanical in execution, a style of drawing possibly demanded by the old-fashioned tastes of the author, who belonged to a time when accuracy was more thought of in architectural drawing than picturesque effect, while perhaps nowadays it is rather too much the other way. As a whole, however, the book is a worthy memorial of the building, and a monument highly creditable to its painstaking author.

The Orders of Architecture, Greek, Roman, and Italian, selected from Norman's Parallel and other Authorities. Edited with Notes. By R. PHENE SPIERS, F.R.I.B.A., F.S.A. Second Edition, with four additional plates. London: B. T. Batsford. 1893.

THE second edition of this useful collection of the Classic orders is more than a mere re-issue of the first. The four new plates are valuable additions to the work. They consist of three plates giving comparative examples of several specimens, respectively, of the Doric, Ionic, and Corinthian Orders, drawn to scale, and showing the order complete, with the full length of the column, so that the proportions and general aspect of various examples can be compared at a glance. The fourth new plate is a collection of profiles of Greek mouldings furnished from recent measurements by Mr. R. W. Schultz, drawn to a uniform scale of one-third the actual size. This is a very important addition, and one that we are very glad to see, the more so as we may perhaps assume that it is partly the result of a suggestion we made in reviewing at some length the first edition (*Builder*, July 18, 1891). We also notice that the unnecessary scale which was appended in the first edition to the plate showing four examples of the orders reduced to the same scale, and which, as we pointed out, was misleading in a plate dealing only with the proportions of orders which were actually all on different scales, has been removed.

We certainly wish that another suggestion we made, that the Doric order of the Parthenon should be included, had been acted on; we can hardly understand the publication of a collection of illustrations of the Doric order with the Parthenon omitted, more especially as some of our architectural students, judging from some drawings we have seen submitted in the Institute competitions, have obviously very hazy ideas as to the real details of the Parthenon order. However, the book was a very useful one before (as testified by the fact that the first edition is already exhausted), and is a still more useful one now.

Goring, Oxon: its Church and Priory. By PERCY G. STONE.

SOME little time since we published some drawings by Mr. Stone of "Tiles found at Goring." These were found in the course of the investigations which have resulted in the publication of this very pretty got-up and interesting monograph. By a series of excavations Mr. Stone has been able to recover nearly all the plan of the Priory of

St. Mary, Goring, of which now only a part of the church remains as a building, the present parish church of Goring. The book gives a historical sketch of the church and priory from documentary evidence, with illustrations of various interesting architectural details, and a considerable number of tiles besides those which we published. Though a small book, it represents a great deal of work, and is a very good contribution to our archaeological literature.

Practical Suggestions, by ROGERS FIELD, M.Inst.C.E., as to *Water-supply, Drainage and Sewage Disposal for Lunatic Asylums*. Issued by the Commissioners in Lunacy. London: Eyre & Spottiswoode. 1892.

This pamphlet, though nominally drawn up as a set of directions for the sanitation of lunatic asylums, contains only a few detailed provisions (as to arrangement of w.c.'s for instance) which are limited in their application to asylums; it is in reality a set of recommendations in regard to drainage and sanitation of large buildings generally, drawn up for the guidance of the Commissioners in Lunacy, and as a kind of text-book for their Department, but for the most part of general application.

In this respect it forms an admirable summary of the most important points to be borne in mind in providing for the sanitary condition of any large building situated in open country, whether asylum, hotel, or mansion, or whatever it may be: for the main considerations urged here are equally applicable to all. The concisely-expressed result of the knowledge and experience of an exceptionally able sanitary engineer, this pamphlet is a most useful one, and we recommend it to the attention of young architects as an excellent guide to the outlines of sanitation. Though a Government paper, and not "published" in the ordinary sense, we presume that it can be purchased, like other Government papers, from the "Queen's printers."

TRADE CATALOGUES.

UNDER the title "A New Chapter in the History of Labour," Mr. Keith, the well-known boiler and heating engineer, sends us what is in fact a splendidly illustrated catalogue of some of the boilers and sanitary and heating apparatus turned out by his firm, prefaced by an account of the circumstances under which he introduced the week of forty-eight hours at his works, without any reduction of wages, in the belief that superior energy of work over shorter hours would make up for the apparent commercial sacrifice. Only a thorough confidence in the ability and goodwill of his staff could have enabled an employer to take up this position; and indeed the whole report of the proceedings is creditable alike to employer and employed, in regard to the spirit which seems to have animated both sides. Mr. Keith's system is that work begins at 8 a.m., breakfast being taken before it, in the men's own time, and work continued till a 12.15 dinner hour. This may seem rather a long stretch of labour, but the men appear to have accepted the three hours gain per week as an ample compensation. The catalogue contains a number of very elaborately shaded diagrams of special things turned out by the firm, with some useful data and information specially drawn up to assist architects and engineers in calculating and specifying the details of a heating system and other work. The only things we have to find fault with in the book are the drawings of "ornamental" radiators and heating apparatus (pages 38 to 41). We wish we could persuade large makers like Mr. Keith that no value whatever is added to such articles by the introduction of commonplace cast-iron ornament(?). Every architect and artist, and every person of any artistic perception, would prefer plain well-made work to this kind of trade decoration.

The Ebbw Vale Company send us their new illustrated catalogue of brick and tile mouldings and ornaments manufactured by them. There is considerable variety in the ornamental details, by means of which some effect can be obtained in cases where the cost of producing original ornament cannot be afforded, though few architects are for stock ornament, except of a very simple repeating type. A good many of the panels for friezes are rather too complicated and tricky in design. Among the best are those numbered 21, 406, 407, 419, 439, and 454.

Messrs. Henry Sandell & Sons send us their illustrated catalogue of mouldings, balusters, jewels, architraves, framing of all kinds, electric casings, &c., offering a very extensive and

varied selection of moulded stuff kept in stock or ready at short notice.

Messrs. Joseph Cliff & Sons send us their admirably got-up catalogue of baths and bath fittings, their speciality being porcelain baths, which are strongly made and well designed for their purpose, and made (as all baths should be) to fix without casings, unless the latter are specially desired, as they never should be; it is merely going to extra expense to render a bathroom more luxurious-looking, perhaps, but less healthy; and even with regard to appearance the clean-looking porcelain bath, standing free on the floor, is to our thinking far more agreeable to the eye than wooden casings.

Correspondence.

To the Editor of THE BUILDER.

THE INSTITUTE EXAMINATIONS.

SIR,—Mr. Cates is right—I was unaware of the proposed change in the programme of the examinations to "be made when the new Final Examination comes into operation in 1895," but it should be an improvement.

Even so, however, there is nothing to prevent the gentleman who set the subject in "Design," to which I referred in my address at the Association, from following up the same brilliant idea at the next examination; choosing, say, "A Suburban Gin Palace" for the subject, and demanding the production of a still more impossible number of drawings.

Cannot something be done, at once, to protect the men who will come up for examination before 1895 from a recurrence of this sort of thing?

ED. W. MOUNTFORD.

LANCASHIRE ASYLUM COMPETITION.

SIR,—As the Justices have appointed Mr. C. H. Howell as their assessor in this competition, I venture to write on behalf of such architects as may run the risk of competing, after your able and just criticism on the award of prizes in the case of the late Staffordshire Asylum last June, in the hope that the profession will, through your columns and elsewhere, protest against the appointment of any referee who is known to premiate such plans only as are in accord with his own particular opinions, which are not shared by many architects of high standing in the arrangement of asylums.

The competitors ought to expect that every proposal should receive on its own merits a fair and impartial consideration.

A WOULD-BE COMPETITOR.

Our correspondent has not quite put it in the right way. We did not condemn Mr. Howell for awarding premiums only to plans which were in accordance with his own special opinions; every assessor who has any opinions must do that, unless he regards his own opinion as worthless. We protested against the constant engagement of the same architect as assessor in the same class of competitions, whereby the competitors are tied down into the same groove, the competition becomes a foregone conclusion, and one of the best objects of competitions, that of getting new ideas on a subject, is nullified. The fault is really with the competition committees, who select the same assessor over and over again merely because they know his name, and to save themselves the trouble of looking for a new adviser.—ED.

WINCHCOMBE.

SIR,—Allow me to correct a statement in your last issue as to the "charming gabled house said to have been erected by Inigo Jones." If the writer had examined the house closely, he would have found it was a Tudor house, much earlier than Inigo Jones's time.

A free Classic porch, and finials to the gables, have been inserted, entirely changing the character of the building; but they lack the refinement of Jones's work as seen at Redland and in other parts of the country. Take these away and you have a gabled house of the usual Domestic Gothic type to be found all over the Cotswolds.

Thanking you for the valuable article on the Abbey, I trust to see a similar work done for the neighbouring Abbey of Hailes.

ROBERT PHILLIPS,
County Surveyor for Gloucestershire.

SLUGS.

SIR—I should be glad if any reader could kindly inform me through the medium of your columns as to a means for the extermination of slugs from a house which is infested. Salt has been tried, but has proved ineffective.

S. T. T.

The Student's Column.

GEOLOGY.—XIX.

ENERGY AND GEOLOGICAL STRUCTURE
(continued).

THE influence of geology on scenery is particularly well exemplified by the Isle of Portland—interesting to the architect from more than one point of view. Fig. 1 is a geological map of the island based on that of the Geological Survey, from which it will be

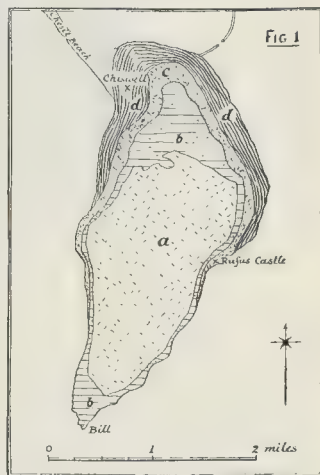


Fig. 1.—Geological Map of the Isle of Portland.
a. Purbeck Beds. b. Portland Sand. c. Portland Stone. d. Kimmeridge Clay.

seen that the uppermost bed is the Purbeck, which is here, as on parts of the mainland,* in a much disturbed condition. It is, however, only a few feet in thickness, so that, although the map indicates its presence over a large portion of the island, the beds next below—the Portland Stone series—govern surface features to a large extent. The formation known as the Portland Stone consists of a number of different beds, and, so far as jointing and hardness are concerned, may be divided into three parts—(1) the *Upper*, consisting of rubble, thin slaty bedded deposits, dirt-beds, and rough stone (none of which are used commercially) called "Bacon tier," "Aish tier," "Soft burr," &c.; (2) the *Middle*, hard stone, running in regular beds, often many feet in thickness, and known as "Top Cap," "Skull Cap," "Roach," "Whitbed," and "Basebed"; and (3) the *Lower*, several yards in thickness, composed of impure limestones, with frequent layers of flint, fossil oyster-shells, &c. It will thus be observed that the upper division is comparatively soft, and could produce no striking surface features so far as weathering on the large scale is concerned. The middle division, on the other hand, being mainly large solid blocks with considerable weather-resisting properties, stand out in bold relief in the cliffs of the island. The lower division, the flinty series, is of varying degrees of hardness, and thinly bedded, producing scenery of a rugged description, especially near Rufus Castle.

The general nature of the Portland beds is well seen at Portland Bill, of which Fig. 2 is a rough sketch. In this we have only two of the divisions mentioned, the middle and lower; though it is just possible that remains of the upper are present on the summit of the headland. Confining our attention to the detached mass of rocks shown in the figure, it may be remarked that the large loose blocks on the top are representatives of the "Top and Skull Caps," the thick, solid-looking bed next below, from which a large block has become detached (and leaning against the mass, bridges over the gap between it and adjacent rocks), may be divided into two parts, not distinguished by a divisional plane—the upper, or "Roach," and the lower, or "Whitbed." The difference between these two beds here is not so apparent as in some other parts of the island. Then, in descending order, comes the "Basebed," separated from the "Whitbed" in our

* See p. 267, ante.



Fig. 2.—View of Portland Bill.—Showing Unequal Weathering of Various Members of the Portland Series.

illustration by a distinct divisional plane, which has determined the shape of the surface of the ledge of rocks on the same level to the right. From this point to the bottom of the section the student will observe the correspondence in the various members of the series, between the isolated mass and the rocks contiguous. The "Basebed," as will be seen, is not so thick as the bed above, but judging from its method of weathering, it is nearly as durable on the large scale. Thus, on looking at the profile of our figure, which is taken from an original photograph, the angle at which the two beds weather is seen to be practically the same, though a view taken from the other side of the Bill shows the "Basebed" slightly weathered in. The flinty series underneath the latter and down to the sea level, has the aspect of a number of beds of cinders. It will be seen at a glance that certain of these offer considerable resistance to the weather, standing out much more prominently than the beds above; whilst others are comparatively soft and have been deeply eaten into.

summit is not many feet above sea-level. Thus, Portland may be likened to a wedge having its thick end to the north. The most conspicuous feature of the island when viewed a few miles off, from the east or west, is its surface, which is remarkably even, whilst not a single clump of trees is seen except in one part—Pennsylvania Castle. Portland appears to be crowned by a gigantic "stone fortress" running all round the island, above which here and there a few houses are seen.

The student will appreciate these various surface features and make out the structure of the island on comparing the map (fig. 1) and the following geological section (fig. 4) with the sketch (fig. 3). It will be observed that there is a bare covering of Purbeck beds, which form the soil, so to speak, of the southern half of the island, excluding drift beds in parts. The "stone fortress," on nearer inspection, is seen to be no fortress at all, but the capping and solid building stone beds, which have withstood the action of the weather for ages, and stand out in the sea-cliffs; in fact, the



Fig. 3.—Outline Sketch of the Isle of Portland, from near Sandsfoot Castle, Weymouth.

In studying the various phases and structure of the Portland "Roach," "Whitbed," and "Basebed," all of which are used for building purposes—especially the two last-mentioned—the student will do well to visit the Bill. We refrain from offering any remarks on this subject, at the moment, as they would not be pertinent to the present discussion.

preservation of the island is due to these hard deposits, which protect the beds beneath, for if made of less durable material it would have disappeared by denudation long ago. The southerly dip of the beds has also determined the plateau surface slope. The effect of the Portland Sand is partly masked on the west side of the island by the enormous blocks of stone and quarry

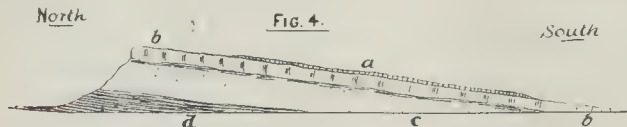


Fig. 4.—Geological Section of the Isle of Portland. (Strata indicated as in Fig. 1.)

Having given some details of the anatomy of the island let us see if we can trace their effects in the general appearance of Portland as viewed from a distance. Fig. 3 is an outline sketch of it taken from near Sandsfoot Castle, Weymouth, omitting the Chesil Beach for the sake of clearness. The high ground on the left is the north of the island, and in profile we observe that its uppermost part stands almost perpendicular, below which comes a steep slope, and the base of the hill lies at a low angle; the surface is almost flat in the centre foreground. The high ground alluded to forms a kind of plateau which gradually slopes southward, until on nearing the Bill the

rubbish that have been thrown over the cliff; but under the Verne, on the north, it forms a steep slope to the Kimeridge Clay. The town of Chiswell, Portland Castle, and vicinity are all situated on the flats and undulations of the last-mentioned formation.

MR. GEORGE HILL, MASON, AND MR. J. B. CODRINGTON, ONE OF THE INSPECTORS OF THE LOCAL GOVERNMENT BOARD, OPENED AN INQUIRY AT THE NEW MUNICIPAL BUILDINGS, EALING, ON THE 26th ult., WITH REFERENCE TO AN APPLICATION BY THE URBAN AUTHORITY OF THAT DISTRICT FOR PERMISSION TO BORROW £25,000, FOR PURPOSES OF ELECTRIC LIGHTING.

GENERAL BUILDING NEWS.

MISSION CHURCH, BURRADON COLLIERY, NORTHUMBERLAND.—On the 16th ult. the foundation-stone of a new mission church at Burradon Colliery was laid by Sir John W. B. Riddell, of Hepple. The church will be entirely of stone, with traceried windows, and will consist of nave and chancel. The total length of the nave, including vestries, will be 43 ft. by 25 ft. wide, and the chancel will be 24 ft. in length by 15 ft. 9 in. in width. The architects for the building are Messrs. Hicks & Charlewood, of Newcastle; and the contractor, Mr. Amos Gray, of Wide Open.

NEW INSTITUTE AT BROMSGROVE, NEAR BIRMINGHAM.—The foundation-stone of a new Institute at Bromsgrove was laid by Lord Windsor on the 17th ult. The new building will occupy a site on the New-road, adjoining the Cottage Hospital, and the elevation has been so designed by the architect, Mr. John Cotton, that when the new School of Art, which it is proposed shall adjoin it, is erected, the whole block will harmonise. There will be a vestibule and hall, with a reading-room on one side and a library on the other. At the far end of the hall will be a lecture-room, and this will also be available for gymnasium purposes. Above the library and reading-room there will be two large rooms for recreation. The builders are Messrs. Tilt & Weaver, and their contract amounts to 1,300l.

PRIMITIVE METHODIST CHAPEL IN LEROS.—On the 21st ult. the memorial stones of a new Methodist chapel were laid in Meenwood-road, Leeds. The cost of the new chapel is estimated at about 2,400l. There is to be a gallery on three sides, and seating accommodation provided for 700 people. The style of the building is to be Classical. There will be a minister's vestry, and also two large meeting vestries. Messrs. Ambler & Bowman, of Leeds, are the architects.

PRESBYTERIAN CHURCH, ST. ROLLOX, GLASGOW.—On the 7th ult. the memorial stone was laid of the new church which is being erected in Springburn-road for the St. Rollox United Presbyterian congregation. The building is being erected from the designs of Mr. John Hamilton, architect, Glasgow. All the accessory accommodation is placed in a basement within the four main walls, the roofing being in one span. The principal front to Springburn-road has a central gable, filled in its upper part by three large one-light windows. The main entrance is by a doorway in the centre of the front gable, deeply recessed and having splayed jambs moulded above the arch springing, and filled in with an enriched tympanum. There is also an exit door in the base of the south staircase, and another at the west end of the church. The elevation of the Fountainwell-road is divided by buttresses into six bays, five of which are filled in with long one-light windows, and the sixth is occupied by the staircase. The elevation to the north is treated in a similar but simpler manner. The accommodation in the basement includes vestry, manager's room, soirée kitchen, class-rooms, and a large hall. The whole are in communication with the area floor, but the principal entrance is by the Fountainwell-road, through a doorway in the west gable. The stone for the principal moulded, carved, and traceried work is from Giffneck Quarry, and the rest is from Auchinlea. The roofs are to be covered with light green Aberfoyle slates, finished with red tile ridging. The structure will be roofed in one span. Including the choir, the roof is provided for 715, of which 285 are in the galleries, and the large hall below will accommodate about 245. The cost of the building is estimated at 4,460l. The tradesmen are as follow: Mr. George Hill, mason; Allan & Cowan, joiners; John Barrie, plumber and gasfitter; John Struthers & Son, plasterers; John Anderson, slater.

RESTORATION OF THE CHOIR OF PETERBOROUGH CATHEDRAL.—Much progress has recently been made towards the completion of the restoration of the choir of Peterborough Cathedral. The five new stalls have been erected on the north side, leaving only six now to be provided to complete the full number of stalls. The carved seats and book-boards for the lay clerks and chorists have also been erected. The old organ and case have been removed, and the erecting of the new organ, the gift of an anonymous donor at a cost of 4,400l., is being rapidly proceeded with. The canopied reredos of white alabaster, of baldachino design, supported by four red marble columns, will shortly be erected, and the iron screens at a cost of 500l., the public memorial to the late Dean Angles, are being prepared for their place in the sacristy. Another donor has undertaken to erect entrance-gates to the choir, with pillars, as designed by Mr. Pearson. All that is required to complete this portion of the work now are six stalls, choir-screen, altar-rails, and credence table.

FEVER HOSPITAL, LONDON.—An inspection by the Managers of the Metropolitan Asylums Board of the new Fountain Temporary Hospital took place on the 21st ult. at Lower Tooting. The urgent need for further hospital accommodation in view of the prevalence of fever in London compelled the Board to arrange for the erection of a hospital without the customary preliminaries of inviting tenders for the work and entering into contracts. They, therefore, instructed their Architect (Mr. Thos. W.

(Aldwinckle) to erect a building containing space for 400 beds. The ground, which covers altogether about thirty-three acres, cost a little over 12,000*l.* Of this area, twenty-three acres have been reserved for the purposes of a permanent hospital, shortly to be commenced, while the remaining ten acres are being covered with temporary buildings for the purpose of a temporary hospital. A large number of men have been employed, the daily average working under the five building firms being 1,500. The hospital provides beds for 400 patients, viz., 390 in the ordinary wards, and sixteen in isolation wards. Its general plan can be best described as having a central administration block, with ward pavilions on each side, the whole being connected by means of a main central corridor having open sides. The porter's lodge faces Grove-road, and has entrance gates on each side, one set of gates forming an "infected entrance" leading to the receiving wards, and the other set forming a "non-infected entrance," leading to the administration block and stores. The administration block comprises medical officer's house, committee-rooms, sitting-rooms, and bed-rooms for the principal officers; main kitchen, general stores, nurses' mess-room, servants' mess-room, dispensary, and office for the medical superintendent and matron. It leads directly from the main central corridor. Accommodation is provided for the different classes of nurses in separate blocks, there being forty nurses and fifty assistant-nurses. The charge nurses have each a separate bedroom, and the assistant-nurses each a cubicle. There is also provided for recreation purposes. Provision is made in three separate huts for seventy-six female servants, each but having a general sitting-room, and the male servants are accommodated in a hut near the entrance. There are sixteen main ward pavilions, all of the same character, and one description will, therefore, apply to all, except that three of the wards are slightly reduced in length to meet the requirements of the Local Government Board as to the distance of infected buildings from the boundary of the site, which is in no case less than 100 ft. Each main ward receives twenty-four beds, and is 144 ft. long, 26 ft. wide, 11 ft. high to the ceiling of the roof and 13 ft. 6 in. high to the ceiling, giving to each bed a wall space of 12 ft. 8 in. floor area of 156 ft., and a cubic capacity of 2,000 ft.³. The buildings, with a few exceptions, are constructed with walls and roofs of timber framing covered externally with boarding, felt, and galvanised corrugated iron, the walls standing upon brick and concrete bases. The floors of all wards and rooms are of wood laid upon felt and fir fillets, the whole resting upon cement concrete 6 in. thick. The whole of the internal woodwork, including windows and doors, has been varnished. The boarding is vertical and V-jointed, as less likely to harbour dust. The buildings have been practically erected, fitted, and furnished within nine weeks. Mr. Aldwinckle has been assisted by Mr. E. T. Marking as clerk of the work, and Mr. Dolby as consulting engineer.

FREE LIBRARY, PENZANCE.—On the 13th ult. the Penzance New Free Library was opened. The plans of Mr. Henry White, architect, of Penzance, the old Art Museum in Morrab-road has been structurally altered by Mr. W. H. Rounson, contractor, of Penzance, so as to form a library. There are lending, reference, and reading departments, the lending department offering accommodation for 13,000 books.

NEW CHURCH, FULHAM.—On the 28th ult. the Duchess of Albany laid the foundation-stone of the new church of St. Matthew, which is about to be erected on a site in the Wandsworth Bridge-road, Fulham. The building is to afford accommodation for 850 worshippers, and the total cost is to be 5,500*l.* The church will be of a simple character, and will be composed entirely of brick. The nave and aisles are to measure 85 ft. long by 59 ft. wide, while the chancel will be 33 ft. long by 27 ft. wide. The vestries will be placed below the chancel, owing to the level of the site being considerably lower than the surrounding road. Mr. Arthur W. Blomfield is the architect.

THE CLUB CAFÉ, STRAND.—A new club has just been opened in the Strand, opposite the Vaudeville Theatre, where the advantages of a club are provided free of charge to customers. The ground floor is used as a restaurant, while on the first floor smoking and reading rooms for gentlemen, and on the floor above is a drawing-room for ladies, with dressing-rooms and lavatories on the top floor. The ladies' lavatories have been provided in the basement. Messrs. Linn & Son, of Duke-street, Delphi, did the general and sanitary work. Messrs. Barron & Wilson, of King William-street, Strand, did the kitchen fittings and hot water work, and Messrs. Drew & Cadman, of High Holborn, did the shop front, all in accordance with the plans and under the supervision of the architect, Mr. P. E. Aldrich, of Parliament-street. Messrs. Wallace did most of the furnishing.

HYMERS' COLLEGE, HULL.—The Lord Chancellor (Lord Herschell) formally opened Hymers' College, which has been erected on the site of the Botanic Gardens, Hull, on the 30th ult. We give descriptions of the building, as well as illustrations, in the *Builder* for June 28, 1890, and

January 16, 1892. The architects are Messrs. Botterill, Son, & Bilson, of Hull.

NURSES' HOME, BLACKBURN.—A new nurses' home has just been added to the Blackburn and Lancashire Infirmary. It is of red brick, and corresponds in style to the infirmary, and consists of a building in three parallel blocks connected by a corridor, the whole connected by a covered way with the infirmary. The building contains accommodation for thirty nurses, with a reading-room, matron's sitting-room, and bed-rooms and bath-rooms. The architects are Messrs. Simpson & Duckworth, of Blackburn; the contractors, Messrs. Highton & Son, of Wotton, Blackburn; the furniture by Mr. F. Thomas, of Blackburn. The total cost of the building has been 5,000*l.*

HOMEOPATHIC HOSPITAL, PLYMOUTH.—The new premises in Lockyer-street, Plymouth, which have lately been acquired and adapted to the purpose of a Homeopathic Hospital, were opened on the 10th ult. by the Earl of Morley. The alterations made include sanitary alterations and new floors, strengthened with iron girders and columns. The basement is now devoted to the purposes of kitchen, scullery, pantries, and nurses' dining-room. On the ground-floor are committee-room, men's ward for six beds, and nurses' sitting-room. On the first floor are women's ward for six beds, children's ward and bath-room, and above are private wards for paying patients, matron's room and operating-room, and bedrooms for nurses and servants. The stable buildings at the rear have been partially demolished and converted into a dispensary, approached from Mulgrave-street, having waiting-room, doctor's room, dispensary, and accident and operating rooms. The hospital and dispensary are connected by a glazed corridor. The alterations have been carried out from the plans and under the instructions of the architect, Messrs. King & Lister, of Plymouth, by Mr. W. H. Lethbridge, contractor, and the painting and decorating has been done by Mr. A. J. Osborne.

EXTENSION OF THE NORWOOD COTTAGE HOSPITAL.—On the 23rd ult. the Lord Mayor opened the new wings which have recently been erected at this institution. The new extension provides accommodation for twelve additional beds and two large private wards, also matron and committee rooms, nurses' and servants' bedrooms, additional water-closets and lavatories, and various works in connexion with the staff department. Externally the buildings have red brick facings, the upper story being finished with ornamental hanging tiles, and the roof covered with plain tiles. The architects are Messrs. J. & C. Bowyer, of Upper Norwood, who have carried out the works under the superintendence of Mr. F. Adams Smith, architect, of London.

CHANCEL, WRABNESS CHURCH, ESSEX.—The chancel of this church was reopened on the 24th ult., after restoration. The work has comprised the removal of the old unsightly pulpit and square pews, also the floors, which were of brick, and had sunk considerably owing to the existence of a vault beneath them. New wood and tile floors have been laid, the window tracery renewed in Monk's Park stone, and the walls stripped internally and re-plastered; the south doorway has been refitted with new door and frame. Suitable benches of pitch-pine are provided for the choir and clergy, with chancel and organ on the north side. Mr. William Paskell, of Wix, has had the contract for the builder's work; the organ is by Bevington & Sons; the benches by G. M. Hammer & Co.; the lectern, altar-rails, &c., by Jones & Willis; the tile floor by Carter, Johnson, & Co.; and the lead glazing by W. James & Co. The work has been carried out from the designs and under the superintendence of Mr. J. Charles Bourne, architect, of London.

NEW BANK, BOWNESS, WINDERMERE.—A new bank for the Liverpool Bank (Messrs. Wakefield's branch) has just been opened at Bowness. The lower part of the walls up to the first floor is built with local stone and red freestone dressings, and the upper part on the two principal fronts is carried out in wood framing, projecting 2 ft. or so over the walls, and finished with cement. The banking-room has a panelled ceiling in pitch-pine, and the floor is laid with wood paving. The front doors are panelled in oak and the rest of the fittings in pitch-pine. The strong-room occupies part of the basement, and is faced with fire-brick set in cement and arched with concrete. A house for the resident manager is arranged on the first and second floors. The work has been carried out by local contractors from the designs and under the superintendence of Mr. Robert Walker, architect, of Windermere.

PROPOSED RE-BUILDING OF SWANSEA PARISH CHURCH.—It is proposed to rebuild the parish church of St. Mary, Swansea, at a cost of 17,000*l.*, from designs prepared by Sir Arthur Blomfield, A.R.A. The style of the proposed new building is Early English, the nave will be 100 ft. in length, 64 ft. in width, and 50 ft. in height, with a chancel of suitable proportions. By extension at the west end, and by widening the chancel a few feet, there will be a larger total accommodation on the ground floor than is now provided, including the galleries.

REBUILDING OF PARISH CHURCH, CARSHALTON, SURREY.—The Parish Church of Carshalton, Surrey, which has been almost entirely rebuilt at a cost of over 12,000*l.*, under the direction of Sir

Arthur Blomfield, A.R.A., was consecrated on the 28th ult. by the Bishop of Rochester. The only parts of the old building remaining are the chancel and the tower and the south aisle.

VESTRY HALL, ST. CHRISTOPHER'S CHAPEL, WALKER, NORTHUMBERLAND.—On the 25th ult. the vestry hall and schoolroom of St. Christopher's Chapel, Walker, were opened. The architects were Messrs. Thompson & Dunn, Newcastle. Mr. Bailey of Gateshead was the contractor.

CHANCEL, ST. CATHERINE'S CHURCH, BARTON, LANCASHIRE.—A chancel has just been erected at St. Catherine's Church, Barton, at a cost of 1,500*l.* In the chancel a stained-glass window, to the memory of the late Mr. and Mrs. Henry Boddington, has been placed by Messrs. Burlington & Grylls, of London. The structural alterations have been carried out by Mr. James Walker, Barton, from plans prepared by Mr. Preston, architect.

NEW CHURCH, RICHMOND.—The foundation-stone of the new church in memory of the late Canon Hales, was laid on the 14th ult. at Richmond. The site of the building is on the Richmond side of Selwyn Court. It has a considerable frontage to the main road, and there is in the half acre purchased ample space on which to erect, at a later date, a parish hall. The new church, designed by Sir Arthur Blomfield, A.R.A. and Sons, will seat 750 persons. The committee have accepted Messrs. Dorey & Co.'s tender of 5,490*l.* for the nave and aisles. In addition to this a further sum of about 1,600*l.* will be required (for heating, lighting, &c.) to complete this section of the building. The estimated cost of the chancel, organ chamber, and vestry is 2,500*l.* The style is Early English of a simple character, and the stone is to be principally Kentish rag with tiled roof. The edifice will have a spire, standing at the north-west corner of the church near the road.

SANITARY AND ENGINEERING NEWS.

AN INSANITARY AREA, SHEFFIELD.—At a meeting of the Sheffield Housing of the Working Classes Sub-Committee, held on the 18th ult., the Town Clerk reported that he had completed the reference of the lands, buildings, and premises comprised in the "Crofts" insanitary area, and the City Surveyor presented his estimate of the cost of such lands, buildings, and premises, of the street works connected therewith, and of the value of the surplus lands. The sub-committee recommended that the City Council should be advised to adopt the following improvement scheme under "The Housing of the Working Classes Act, 1890," with respect to the unhealthy area, referred to in the resolution of the Health Committee of March 23, 1893, and that the Town Clerk be instructed to publish the requisite advertisements relative to such scheme during November, and to serve the requisite notices on the owners, lessees, and occupiers of the lands, buildings, and premises comprised in such improvement scheme during the following month. The scheme prepared by the City Surveyor dealt with the area bounded by Lee-croft, Campo-lane, Townhead-street, Tenter-street, and Silver-street Head. (1.) The lands, dwelling-houses, and premises within the limits of the said area shall be taken and purchased compulsorily under the provisions of the said Act in that behalf. (2.) It is necessary for making this scheme efficient for sanitary purposes, and to provide for widening the existing approaches to the unhealthy area, and for opening out the same for the purposes of ventilation and health, that three additional plots of land should also be taken and purchased compulsorily, namely, one plot containing 1,095 square yards, situate in Silver-street Head, between Silver-street and Westler-green; another plot containing 766 square yards, situate in Westler-green, between Queen-street and Silver-street Head; and a third plot containing 339 square yards, situate at the junction of Campo-lane and Lee-croft. Each of such plots is shown on the plan heretofore referred to. (3.) That all the dwelling-houses, buildings, and premises within the limits of the said area, and also all the dwelling-houses, buildings, and premises standing on the said three plots of land above referred to, shall be pulled down and the sites cleared. (4.) That the whole of the said area, including the three plots of land heretofore described, be utilised in part for laying out improved streets and approaches, and in part for the erection of dwelling-houses for the working classes, with suitable curtilages, air spaces, and conveniences.—The City Surveyor estimated the value of the land, buildings, and interests, based upon the fair market value at the time of his valuation being made, due regard being had to the nature and condition of the property, and the probable duration of the buildings at 72,424*l.*; for the alterations to and formation of streets abutting thereon, 8,498*l.*—80,922*l.*; estimated value of surplus land, 21,250*l.*; net cost of the whole scheme, 59,672*l.*

SEWAGE WORKS, LUDLOW.—The Corporation of Ludlow lately advertised for schemes of sewerage and sewage disposal for their borough, and for an adjoining district that is proposed to be included within the limits of the borough area. Three premiums were offered for the best schemes. Eighteen schemes were submitted, and the Corporation unanimously resolved to award the premiums to the

FYFELD CHURCH, BERKSHIRE.—The church dedicated to St. Nicholas, at Fyfeld, near Abingdon, which, as it is announced, was burnt on the 27th ult. had chancel, nave, and north aisle of the Late Pointed style, and a modern tower which has escaped. It contained many memorials of the Golafrs and White families, formerly owners of the manor of Fyfeld, Fylyde, manor. The first Sir John Golafr (*ib.* 128

married Elizabeth, daughter and heir of John Fyfield. In the aisle was the tomb with effigies, one in armour, the other in a shroud, of his descendant, Sir John (ob. 1442), and in the chancel an altar tomb of Lady Catherine Gordon, the "White Rose of Scotland," and Perkin Warbeck's widow, whose representatives, in 1730, sold the manor and advowson to Sir Thomas White. White gave them to the college, St. John's, which was founded at Oxford. Another Sir John Goulfe was ambassador to France from Richard II., by whose desire his body was removed (1395) from Wallingford to Westminster Abbey. His father-in-law, Sir Bernard Brocas, Chamberlain to Queen Isabel, lies in St. Edmund's Chapel, and is "the lord who had cut off the King of Morocco's head," to the account of whom Sir Roger de Coverley listened so attentively. At Fritford, in this neighbourhood, Mr. James Parker, of Oxford, completed, ten years ago, the excavation of a Roman villa, containing eight or nine rooms, and having a hypocaust in the unusual form of pillars (twelve were found), each about 2 ft. 6 in. in diameter, built together, and quarried from local stone.

PHOTOGRAPHS OF PICTURES.—We have received from Mr. F. Hollyer his latest catalogue of photographs from works by eminent painters, the larger proportion being those of Mr. Burne-Jones and Mr. Watts—with prices attached, and miniature photographs of a number of the principal subjects. In regard to which we may observe that a photograph, of the kind which Mr. Hollyer produces, is a great deal more of art, is better worth having than an original drawing of a commonplace type, and costs much less.

PROJECTED IMPROVEMENT OF ABERDEEN SEA BEACH.—The deputation appointed by the Aberdeen Town Council to visit various sea-bathing establishments in the south, with the view of making a report on sea beach as a first-class bathing station, issued their report on the 21st. They recommended that an esplanade with carriage drive should be constructed from the Links Battery to a point opposite the Broad-hill. In order to provide sea-water baths and swimming ponds all the year round, a pavilion would be erected, sea-water flowing in at high water. The construction is further recommended by an electric tramway, starting from Castle-street, proceeding thence by Justice-street, Constitution-street, and the proposed new carriage-way to the sea beach, and returning across the Links to Wellington-street, thence along the Quay and up Marischal-street, to the point of commencement. The deputation do not recommend the construction of a promenade pier, as such piers have almost invariably proved a financial failure. Ultimately the scheme, it is considered, would be a source of revenue to the Corporation, and yield a fair return. The estimated cost is £35,000.

LEGAL.

THE COUNTY COUNCIL AND THE BUILDING ACTS.

ON the 25th ult., at the West London Police-court, a case remitted back from the Court of Queen's Bench was heard by Mr. Curtis Bennett, J. The case, according to the *Daily News*, it was to impose a penalty. A range of buildings had been erected by Messrs. Lawrence & Sons opposite Kensington Gardens, at the corner of a new street called Kensington-court, on the site of Baron Grant's mansion and grounds, which have been turned into new neighbourhood. As the buildings were erected at a height, and as Kensington-court was a new street of less than 50 ft., the London County Council instituted proceedings against Messrs. Lawrence & Sons, with a view to having the buildings reduced to the required height. The case came on for hearing before Mr. Curtis Bennett, who decided in favour of the Council, dismissing the summons with costs. The Council, however, obtained a case, which was argued before the judge, and it was ruled at the builders were wrong, and they remitted the case back to the magistrate to impose a fine. The summons in the first instance was adjourned for an application to be made to the County Council to allow the buildings to remain. Mr. Chilvers, who appeared for the County Council, informed the magistrate that the Council had been refused after consulting the Vestry and other persons who were interested in the matter. Mr. Dickens, Q.C., who appeared for the defendants, recapitulated the facts, and asked the magistrate to inflict a nominal penalty, a purely technical offence only had been committed, and one which did not affect public rights.

He pointed out that it was not until the roof was on in October last that the County Council served a summons, nothing having been done from April up to that time. If two stories had to be taken down it would entail a loss of £200 a year, though the heavy ground rent would remain the same. He submitted that it was a hard case, as the buildings were erected upon the site of an old house with a large frontage. If it had not been for the building of another house next door, and of the road being a few feet under the proper width, there would have been power to erect the buildings to a height of 90 ft. Mr. Chilvers, in reply, said the County Council was not in fault, as the attention of the defendants was called to the buildings in April. Mr. Curtis Bennett said a new point was raised which worked hard, as some very often did. When the case was first before him it was conceded that there was power to build a substantial wall 90 ft. in height in Kensington-road, but it seemed to have been withdrawn before the judges, and contended that there was no right. In an architectural point of view nothing could be worse. A large block of fine buildings might be erected, but on reaching the corner the house would have to be dwarfed, giving a view over the roofs. It was the first case under the new section, and the Court had held that the buildings had been wrongly erected. Therefore there must be a substantial fine. It was hard law, and he wished the County Council to understand he considered that the smallest coin in the realm would be amply sufficient in any future proceedings against the defendants. The case terminated by the magistrate imposing a fine of 60s. with five guineas costs. Mr. Chilvers said he would convey the magistrate's remarks to the County Council.

MEETINGS.

FRIDAY, NOVEMBER 3.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Professor A. Wynter Blyth on "Diseases of Animals in relation to Meat Supply; Characteristics of Vegetables, Fish, &c., unfit for Food." 8 p.m.

SATURDAY, NOVEMBER 4.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Visit to Wimbledon Sewage Farm. 3 p.m.

Sanitary Inspectors' Association.—Inaugural Address by the Chairman, Mr. Henry Thomas. 6 p.m.

MONDAY, NOVEMBER 6.

Royal Institute of British Architects.—The President, Mr. J. Macvicar Anderson, will deliver the opening address of the Session. 8 p.m.

University College.—Lectures on Chaldean and Assyrian Archaeology, by Mr. W. St. Chad Boswell: Chaldean Architecture and City Building. III. 5 p.m.

Society of Engineers.—Mr. R. Nelson Boyd on "Collieries and Colliery Engineering." 7.30 p.m.

TUESDAY, NOVEMBER 7.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Mr. H. Shibley F. Murphy on "Infectious Diseases and Methods of Disinfection." 8 p.m.

Society of Biblical Archaeology.—(1) Paper by the President, Mr. C. C. Parrot; (2) Mr. T. G. Pinches on "The Discoveries of the American Expedition at Niffer." 8 p.m.

Glasgow Architectural Association.—Mr. G. Hill on "Commercial Architecture." 8 p.m.

WEDNESDAY, NOVEMBER 8.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Visit of Inspection in the Parish of St. George's, Hanover-square. 2 p.m.

Liverpool Engineering Society.—Mr. J. A. Saner on "Some English Waterways." 8 p.m.

THURSDAY, NOVEMBER 9.

University College.—Lectures on Greek Sculpture: Pheidias to Lysippus, by Professor Percy Gardner. Polytechnic IV. 5 p.m.

Arts and Crafts Exhibition.—Mr. Lewis F. Day on "Some Ornamental Offshoots of the Italian Renaissance." 8.30 p.m.

Institution of Electrical Engineers.—Professor G. Forbes on "The Electrical Distribution of Power." 8 p.m.

FRIDAY, NOVEMBER 10.

Architectural Association.—Mr. A. Baresford Pite on "How to Study Design"—an introduction to the course of lectures on "Beautiful and Practical Design." 7.30 p.m.

Junior Engineering Society.—Presidential Address by Mr. J. Wolfe Barry. 8 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Mr. J. F. J. Sykes on "General Powers and Duties of Inspectors of Nuisances." 8 p.m.

SATURDAY, NOVEMBER 11.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Visit to the East London Waterworks, Lea Bridge, at 1.30 p.m.; and Leyton Sewage Works, at 3 p.m.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

17,272.—**TESTING DRAINS BY SMOKE.** J. G. Kirtley. In order to facilitate the burning of the material which is used for the smoke test, a chamber, with an atmospheric valve, is provided so that air is supplied to the burning material and then forced through the pipes.

18,255.—**GULLIES AND DRAINS.** W. G. Crow. To thoroughly clean the drains, and to prevent the escape of any stench, an apparatus, made of a spindle with vanes revolving in a trough of water and throwing it off at each revolution, is, according to this invention, employed to impel the current of air through the drains, and in a given direction, so that it is fed harmlessly away.

20,708.—**IMPROVEMENTS IN FIRE-GRATES, STOVES, &c.** T. S. Payne. This invention consists of an improved portable appliance or chamber for temporary or permanent use in stoves for the purpose of causing the more perfect combustion of fuel.

20,707.—**WATER WASTE-PREVENTER.** E. J. Preston and another. This invention relates to a syphonic water waste-preventer, comprising a cistern and well, a cylinder fixed therein with communicating space between the two; a pipe rising from the top of the cylinder into the leg of the syphon, and a piston with rod and connexion to the pull to start it and raise the syphonic action.

21,094.—**CORRUGATED IRON BUILDINGS.** R. R. Speirs. This invention relates to constructing iron buildings with layers of felt, so as to form an air space between it and the internal lining, minimising the passage of heat and sound.

21,011.—**SYPHONIC FLUSH CISTERN.** E. Ward. A compact, reliable, and silent flush is arranged by the disposition of the parts usually employed in flush cisterns.

22,392.—**FLUSHING CISTERN.** F. Sara. In order to prevent noise, an air tube is made to communicate with the top of the syphon, extending so far down into the cistern that it will admit air into the syphon and stop the same before the water has got low enough to uncover the valve and thereby produce the usual objectionable gurgling noise.

5,501.—**DECORATING AND FINISHING TILES.** I. Broome (U.S.A.). This patent relates to ornamenting and finishing tiles by coating the decorative surfaces with paint or glass, in plain or figured designs, then removing the overglaze of liquid from the edges of the tiles so that the same may set true and close when set edge to edge in walls, floors, or ceilings.

NEW APPLICATIONS FOR LETTERS PATENT.

OCTOBER 15.—19,408, J. Robertshaw, Sash-fasteners.—19,415, J. Royle, Heating Stoves.—19,424, G. Drury, Water Tower.—19,439, E. Dandy, Upholstery Hooks.—19,440, F. Bromme, Stoves.—19,442, J. Woodward, Junctions or connections between Service-pipes and Mains for supplying Gas or Water.—19,444, T. Gohn, Protective Paint.

OCTOBER 17.—19,540, A. Saunders and G. Beck, Misting Machines.—OCTOBER 18.—19,609, J. Owen, Fastenings for Sliding Doors, &c.—19,611, F. Eckl, Incandescent Bodies for Incandescent Gas Lights.

OCTOBER 19.—19,639, J. Porter, Stoves or Fire-places.—19,643, J. Reid, Syphonic Valves for Cisterns, &c.—19,645, A. Stafford and J. Dickinson, Fastener for Windows.—19,681, H. Banance and E. Simmons, Attachment of Knobs to Spindles.—19,703, L. Jones, Manufacture of Fire-clay.—19,707, W. Thompson, Safety Work-bench.—19,710, J. Wilson, Kitchen Fire Ranges.

OCTOBER 20.—19,748, J. and E. Robbins, Moulds for Moulding or Casting Cements, or Plastic Materials, also in Apparatus for Moulding or Running such Materials.—19,753, A. Bodendstedt, Join, Ratchet Braces.—19,757, C. Mixon, Fastener for Windows, Doors, &c.—19,792, R. Restall, Screws.

OCTOBER 21.—19,833, F. Dietz, Ventilating.—19,846, A. and A. Staples, Kilns.—19,848, R. Cook, Hoffman, or Continuous Kilns for Drying or Burning Bricks.—19,867, W. Shoosmith, Gully Trap.—19,890, S. Briggs, Indicating Heat in Buildings.

PROVISIONAL SPECIFICATIONS ACCEPTED.

16,993, W. and J. Tweddie, New Drain testing Appliances.—16,994, F. Davey, Automatic Method of Disinfecting Water-closets and Urinals.—17,805, J. Dean, Water-closets.—17,928, H. Bartlett, Waste-preventing Cisterns and Syphons for Water-closets, &c.—18,293, J. Harvey, Clamp.—18,466, H. Oimrod & Co., Whitelead Waste Water-Closets.—18,459, D. Keith, Window-sash Frames.—18,549, J. Westwell, Sash-board construction.—18,569, A. Stocks, Cast-iron Fire-grates.—18,583, A. Bost, Construction of Walls.—18,700, M. Blacker, Construction and Fixing of Rain-water Gutters for Buildings.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

22,303, D. Atkinson and J. Kaye, Window-sash Fastener.—23,354, J. Holmes and R. Williams, Pipe Joint or Coupling.—23,413, J. Shanks, Water-closets and Waste-supply Apparatus for same.—23,474, L. Gröber, Lattice for Use in Building Arched Roofs and other Constructions.—6,097, J. Shanks, Water-supply and Discharge Apparatus applicable to Water-closets or other Cisterns.—10,411, Reynolds, Heating and Ventilating Rooms or Enclosed Spaces.—15,506, J. Bowles and C. Mitchell, Combined Saw and Planer.—16,237, S. Haskin, Brick-making Machines.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

OCTOBER 23.—By J. H. Bellith: "Valentin House," Valentin-road, Walthamstow, 1, r. 402, 500ft.—By Messrs. Foster: 35, 39, Kempford Gardens, Kensington, ut. 73 yrs., g.r. 124, r. 102d.—By Brown & Pauline (at Tring): F. houses and 46 acres, Little Tring, Herts, 3,350l.

OCTOBER 24.—By C. H. Brown: 7, Mayfield Villas, Wandsworth, ut. 26 yrs., g.r. 61, 66, 69d.; 14 Glasgow-ter, Belgravia, ut. 31 yrs., g.r. 64, 26d.—By A. Richards: 864, 866, High-street, Tottenham, cottages and land, 20 a. 31 to p. 14, 1,350l.—By Mrs. Brown, et al.: 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 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1491, 1493, 1495, 1497, 1499, 1501, 1503, 1505, 1507, 1509, 1511, 1513, 1515, 1517, 1519, 1521, 1523, 1525, 1527, 1529, 1531, 1533, 1535, 1537, 1539, 1541, 1543, 1545, 1547, 1549, 1551, 1553, 1555, 1557, 1559, 1561, 1563, 1565, 1567, 1569, 1571, 1573, 1575, 1577, 1579, 1581, 1583, 1585, 1587, 1589, 1591, 1593, 1595, 1597, 1599, 1601, 1603, 1605, 1607, 1609, 1611, 1613, 1615, 1617, 1619, 1621, 1623, 1625, 1627, 1629, 1631, 1633, 1635, 1637, 1639, 1641, 1643, 1645, 1647, 1649, 1651, 1653, 1655, 1657, 1659, 1661, 1663, 1665, 1667, 1669, 1671, 1673, 1675, 1677, 1679, 1681, 1683, 1685, 1687, 1689, 1691, 1693, 1695, 1697, 1699, 1701, 1703, 1705, 1707, 1709, 1711, 1713, 1715, 1717, 1719, 1721, 1723, 1725, 1727, 1729, 1731, 1733, 1735, 1737, 1739, 1741, 1743, 1745, 1747, 1749, 1751, 1753, 1755, 1757, 1759, 1761, 1763, 1765, 1767, 1769, 1771, 1773, 1775, 1777, 1779, 1781, 1783, 1785, 1787, 1789, 1791, 1793, 1795, 1797, 1799, 1801, 1803, 1805, 1807, 1809, 1811, 1813, 1815, 1817, 1819, 1821, 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2155, 2157, 2159, 2161, 2163, 2165, 2167, 2169, 2171, 2173, 2175, 2177, 2179, 2181, 2183, 2185, 2187, 2189, 2191, 2193, 2195, 2197, 2199, 2201, 220

COMPETITION, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITION.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*Asylum for Lunatics, &c.	Lancashire Asylum Bd.	2000, 1500, and 1000.	No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Supply of Cherbourg Quarrite.	Beckenham Local Bd.	Official.	Nov. 6
Sanitary Alterations at Workhouse.	Parish of St. Matthew.	do.	Nov. 7
Gurney Granite Chippings (80 tons).	Bethnal Green.	do.	do.
Dredging Work, Cornawater River.	Edmonton Union.	do.	do.
New Coast Guard Station, Cornwall.	Belfast Union.	do.	do.
Levelling, Farning, &c.	Admiralty.	J. McKenna.	do.
Additions, &c. to School Buildings, Ince, near Wigan.	Altrincham V.R.S.A.	Heaton & Ralph.	do.
Alterations to Church, Hordley, Aberdeenshire.	Matthews & Mackenzie.	do.	do.
Precipitating Tanks, Filter-beds, &c.	Wuerdts and Wardle.	J. T. Wood.	do.
Hullbridge near Church, Hordley, Aberdeenshire.	Cardiff U.R.S.A.	W. Fraser.	Nov. 8
Water Supply; Works, Court Fm. Llandaff.	Rhodes Calvert.	A. Cree.	do.
Warehouse, Clifton-street, Bradford, Yorks.	York Corporation.	F. W. Stocker.	do.
Public Conveniences, Payment.	do.	do.	do.
Road and Sewer (600 ft.), Britton-hill, S.W.	do.	do.	do.
Righten Dwelling houses, Ravensthorpe, Yorks.	do.	do.	do.
Buildings at Workhouse.	Scarborough Union.	J. Kirk & Sons.	do.
Works at Market-Draying, Lincs.	Exors. of T. Shelton.	F. G. Shilcock.	do.
*Two Furnaces at Duff Wharf.	Mill End Old Town.	do.	do.
Well-sinking, Burying.	Vestry.	J. M. Knight.	do.
Outside Staircase, &c. at Workhouse.	Croydon Corporation.	Official.	Nov. 9
Work in the Fencing.	North Dublin Union.	do.	do.
Park-keeper's Residence.	Croydon Corporation.	do.	do.
Irish White Lime.	Glasgow Police Com.	G. V. Alaing.	Nov. 10
Water Supply Works, Loughlinch, B.	Bunahina S.B.	E. R. S. Kacott.	Nov. 11
Pipe Works, Moor End-road and Jacob-lane.	Hatfield Corporation.	W. Thomas.	do.
Twenty houses, Blaenarwg, Wales.	Pelham Road Club.	P. de C. Meade.	do.
Hospital Isolation Block.	Sharnford Corporation.	do.	do.
Pipe Sewer, Manilla, &c.	Ryton-on-Tyne (Parish).	J. P. Dalton.	Nov. 13
Cemetery Works.	Bothwell (N.B.) Parochial Board.	Crouch & Hogg.	do.
*Paving Works.	Cambswell Vestry.	Official.	Nov. 14
*Making-up Chesham-road, Oxford.	Leisham Bd. of Wks.	do.	do.
*Making-up Haverd-road, Oxford.	do.	do.	do.
Well-sinking, &c.	Southampton Corp.	W. Matthews.	do.
Water Filling 10,000 ft.	Woolwich Local Board.	H. O. Thomas.	do.
Sewerage Works.	C. W. Wilks.	do.	do.
Foot Office, Wrexford.	Sharnford Corporation.	Official.	do.
Railway Stations, &c. Newcastle, Emlyn, and Heslall.	G. W. H. Co.	do.	do.
*Underground Conduits.	do.	do.	do.
Frises.	Com. of Sewers.	do.	do.

CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Terrace of Houses, Croydon.	Midsomer Norton Loc.	R. F. Anderson.	Nov. 1
Sewerage Works, Clarendon.	do.	do.	Nov. 1
*Iron Paving, Gates, &c.	Wood Green Loc. Bd.	C. J. Gwynon.	do.
Additions, &c. to Schools, near Barnsley.	H. C. Shaw.	do.	do.
Electric Lighting Station.	Devalbury Corporation.	H. O. Marks.	Nov. 17
Underpinning.	Pontefract Union.	J. H. Gwynne, Junr.	do.
Sewerage Works.	Buckingham Corp.	B. Latham.	do.
Service Reservoir, &c.	Mountain Ash (Wales) Local Board.	J. Mansergh.	Nov. 20
Sewers and Outfall Works.	Berkhamstead R.S.A.	A. M. Fowler.	do.
School Furniture and Fittings.	West Ham School Bd.	Newman & Jacques.	Nov. 21
Buildings for Electricity Works.	Newport (Mon.) Corp.	R. Hammond.	do.
Water Supply Works.	Radstock Local Board.	T. Martin.	Nov. 22
Sewer Pipes and Stores, Dublin.	G. N. & Co. (Ireland).	do.	Nov. 23
Rebuilding Bridge, Bromfield.	Essex County Council.	do.	Nov. 23
New Post Office, Nottingham.	Com. of H. M. Works.	J. B. Eversard.	Nov. 23
Paving Thoroughfares.	Wolverhampton Corp.	E. K. W. Barrington.	Nov. 27
Sewers, Lowerhouse, Tadiham and Altham.	Barnley Corporation.	F. S. Batton.	Nov. 27
*General Paving Works and Materials.	Whitechapel Bd. of W.	do.	Nov. 27
Aisle and Porch, St. John's Church, Sheffield, Hants.	do.	J. Colson & Son.	Nov. 29
Sewage Works, &c.	Haslingden (Lancs.) Board.	H. L. Hinnell.	Nov. 30
Railway Works, Birkenhead.	Cheshire Lines Com.	Official.	Dec. 2
Sewage Purification Works.	Gorton (Lancs.) Loc. Board.	Lomax & Lomax.	Dec.
New Roads, Cessnael-wig Estate, Bangor, Wales.	do.	Robt. Grierson.	Dec. 8
Alterations, &c. Presbyterian Church.	do.	do.	do.
Lincoln.	Committee.	Wilson & Moxham.	No date
Plastering Work (35,000 yds.) Stonehouse, near Worcester.	Manchester Chess Club.	do.	do.
Business Premises, Wind-street, Swangate.	Irwell Bank Mill.	Wilson & Moxham.	do.
Two Houses and Villa, Bangor, Ireland.	do.	J. Fraser & Son.	do.
*Oak Paving twelve houses.	J. Tumbler.	do.	do.
*Repairs, &c. "Palmerston" Hackney.	do.	Mearns, Seale.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Sanitary Inspector.	St. Matthew (Bethnal Green) Vestry.	1200.	Nov. 7
*General Foreman.	St. George's (St. George's) Vestry.	27 10s.	Nov. 10
*Inspector of Drains.	Bethnal Vestry.	115s. 6d.	Nov. 14
Clerk of Works.	Haslingden & Rawcliffe, stall Lane/Sewerage Board.	31. per week.	Nov. 30

Those marked with an Asterisk (*) are a verted in this number. Competition, p. iv. Contracts, pp. iv, vi, and vii. Public Appointments, pp. xii, and xxv.

OCTOBER 26.—By *Farbrother, Ellis & Co.*: "The Harpenden Brewery," Harpenden, Herts., with residence, 43 acres, and eighteen public-houses, 16,000.—By *G. C. & F. Moore*: 9, 10, 11, Arley-lane, Mile End, u.t. 30 yrs., g.r. 5s. 6d.; 11 to 17 (odd), Swanton-rd., Bromley-by-Bow, u.t. 60 yrs., g.r. 10s. 6d.; 18 to 20, u.t. 30 yrs., g.r. 10s. 6d.; 21, u.t. 30 yrs., g.r. 10s. 6d.; 22, u.t. 30 yrs., g.r. 10s. 6d.; 23, u.t. 30 yrs., g.r. 10s. 6d.; 24, u.t. 30 yrs., g.r. 10s. 6d.; 25, u.t. 30 yrs., g.r. 10s. 6d.; 26, u.t. 30 yrs., g.r. 10s. 6d.; 27, u.t. 30 yrs., g.r. 10s. 6d.; 28, u.t. 30 yrs., g.r. 10s. 6d.; 29, u.t. 30 yrs., g.r. 10s. 6d.; 30, u.t. 30 yrs., g.r. 10s. 6d.; 31, u.t. 30 yrs., g.r. 10s. 6d.; 32, u.t. 30 yrs., g.r. 10s. 6d.; 33, u.t. 30 yrs., g.r. 10s. 6d.; 34, u.t. 30 yrs., g.r. 10s. 6d.; 35, u.t. 30 yrs., g.r. 10s. 6d.; 36, u.t. 30 yrs., g.r. 10s. 6d.; 37, u.t. 30 yrs., g.r. 10s. 6d.; 38, u.t. 30 yrs., g.r. 10s. 6d.; 39, u.t. 30 yrs., g.r. 10s. 6d.; 40, u.t. 30 yrs., g.r. 10s. 6d.; 41, u.t. 30 yrs., g.r. 10s. 6d.; 42, u.t. 30 yrs., g.r. 10s. 6d.; 43, u.t. 30 yrs., g.r. 10s. 6d.; 44, u.t. 30 yrs., g.r. 10s. 6d.; 45, u.t. 30 yrs., g.r. 10s. 6d.; 46, u.t. 30 yrs., g.r. 10s. 6d.; 47, u.t. 30 yrs., g.r. 10s. 6d.; 48, u.t. 30 yrs., g.r. 10s. 6d.; 49, u.t. 30 yrs., g.r. 10s. 6d.; 50, u.t. 30 yrs., g.r. 10s. 6d.; 51, u.t. 30 yrs., g.r. 10s. 6d.; 52, u.t. 30 yrs., g.r. 10s. 6d.; 53, u.t. 30 yrs., g.r. 10s. 6d.; 54, u.t. 30 yrs., g.r. 10s. 6d.; 55, u.t. 30 yrs., g.r. 10s. 6d.; 56, u.t. 30 yrs., g.r. 10s. 6d.; 57, u.t. 30 yrs., g.r. 10s. 6d.; 58, u.t. 30 yrs., g.r. 10s. 6d.; 59, u.t. 30 yrs., g.r. 10s. 6d.; 60, u.t. 30 yrs., g.r. 10s. 6d.; 61, u.t. 30 yrs., g.r. 10s. 6d.; 62, u.t. 30 yrs., g.r. 10s. 6d.; 63, u.t. 30 yrs., g.r. 10s. 6d.; 64, u.t. 30 yrs., g.r. 10s. 6d.; 65, u.t. 30 yrs., g.r. 10s. 6d.; 66, u.t. 30 yrs., g.r. 10s. 6d.; 67, u.t. 30 yrs., g.r. 10s. 6d.; 68, u.t. 30 yrs., g.r. 10s. 6d.; 69, u.t. 30 yrs., g.r. 10s. 6d.; 70, u.t. 30 yrs., g.r. 10s. 6d.; 71, u.t. 30 yrs., g.r. 10s. 6d.; 72, u.t. 30 yrs., g.r. 10s. 6d.; 73, u.t. 30 yrs., g.r. 10s. 6d.; 74, u.t. 30 yrs., g.r. 10s. 6d.; 75, u.t. 30 yrs., g.r. 10s. 6d.; 76, u.t. 30 yrs., g.r. 10s. 6d.; 77, u.t. 30 yrs., g.r. 10s. 6d.; 78, u.t. 30 yrs., g.r. 10s. 6d.; 79, u.t. 30 yrs., g.r. 10s. 6d.; 80, u.t. 30 yrs., g.r. 10s. 6d.; 81, u.t. 30 yrs., g.r. 10s. 6d.; 82, u.t. 30 yrs., g.r. 10s. 6d.; 83, u.t. 30 yrs., g.r. 10s. 6d.; 84, u.t. 30 yrs., g.r. 10s. 6d.; 85, u.t. 30 yrs., g.r. 10s. 6d.; 86, u.t. 30 yrs., g.r. 10s. 6d.; 87, u.t. 30 yrs., g.r. 10s. 6d.; 88, u.t. 30 yrs., g.r. 10s. 6d.; 89, u.t. 30 yrs., g.r. 10s. 6d.; 90, u.t. 30 yrs., g.r. 10s. 6d.; 91, u.t. 30 yrs., g.r. 10s. 6d.; 92, u.t. 30 yrs., g.r. 10s. 6d.; 93, u.t. 30 yrs., g.r. 10s. 6d.; 94, u.t. 30 yrs., g.r. 10s. 6d.; 95, u.t. 30 yrs., g.r. 10s. 6d.; 96, u.t. 30 yrs., g.r. 10s. 6d.; 97, u.t. 30 yrs., g.r. 10s. 6d.; 98, u.t. 30 yrs., g.r. 10s. 6d.; 99, u.t. 30 yrs., g.r. 10s. 6d.; 100, u.t. 30 yrs., g.r. 10s. 6d.; 101, u.t. 30 yrs., g.r. 10s. 6d.; 102, u.t. 30 yrs., g.r. 10s. 6d.; 103, u.t. 30 yrs., g.r. 10s. 6d.; 104, u.t. 30 yrs., g.r. 10s. 6d.; 105, u.t. 30 yrs., g.r. 10s. 6d.; 106, u.t. 30 yrs., g.r. 10s. 6d.; 107, u.t. 30 yrs., g.r. 10s. 6d.; 108, u.t. 30 yrs., g.r. 10s. 6d.; 109, u.t. 30 yrs., g.r. 10s. 6d.; 110, u.t. 30 yrs., g.r. 10s. 6d.; 111, u.t. 30 yrs., g.r. 10s. 6d.; 112, u.t. 30 yrs., g.r. 10s. 6d.; 113, u.t. 30 yrs., g.r. 10s. 6d.; 114, u.t. 30 yrs., g.r. 10s. 6d.; 115, u.t. 30 yrs., g.r. 10s. 6d.; 116, u.t. 30 yrs., g.r. 10s. 6d.; 117, u.t. 30 yrs., g.r. 10s. 6d.; 118, u.t. 30 yrs., g.r. 10s. 6d.; 119, u.t. 30 yrs., g.r. 10s. 6d.; 120, u.t. 30 yrs., g.r. 10s. 6d.; 121, u.t. 30 yrs., g.r. 10s. 6d.; 122, u.t. 30 yrs., g.r. 10s. 6d.; 123, u.t. 30 yrs., g.r. 10s. 6d.; 124, u.t. 30 yrs., g.r. 10s. 6d.; 125, u.t. 30 yrs., g.r. 10s. 6d.; 126, u.t. 30 yrs., g.r. 10s. 6d.; 127, u.t. 30 yrs., g.r. 10s. 6d.; 128, u.t. 30 yrs., g.r. 10s. 6d.; 129, u.t. 30 yrs., g.r. 10s. 6d.; 130, u.t. 30 yrs., g.r. 10s. 6d.; 131, u.t. 30 yrs., g.r. 10s. 6d.; 132, u.t. 30 yrs., g.r. 10s. 6d.; 133, u.t. 30 yrs., g.r. 10s. 6d.; 134, u.t. 30 yrs., g.r. 10s. 6d.; 135, u.t. 30 yrs., g.r. 10s. 6d.; 136, u.t. 30 yrs., g.r. 10s. 6d.; 137, u.t. 30 yrs., g.r. 10s. 6d.; 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WELLINGBOROUGH.—For the construction of two service reservoirs and pump-lifts, Hartshead, for the Local Board. Mr. E. Sharnam, Surveyor, Local Board Offices, Wellingborough. Quantities by Surveyor—Siddons & Freeman. £2,451 F. Brown & Son. £2,226 J. T. Wingrove. £2,881 Salden Hipwell. £2,039

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Japanese Art at the Chicago Exhibition.



HOUGH the famous Exhibition has now closed, it will not be out of place to put on record the impression produced by the remarkable Japanese Exhibition, in some respects the most striking exhibit of all. Since Japan has been opened to commerce, its art has suffered a steady and continued degradation, due partly to the desire to take early and frequent advantage of the Western markets, partly to the ignorance of Europeans and Americans as to what constituted the best in Japanese art, and the consequent ease with which articles of an inferior grade were worked off on them. So marked has been this movement, and so steadily have the causes operated that produced it, that the best forms of native art have faded fair to disappear for ever. But Japanese art is no longer a closed book to Western collectors; travellers and artists have made its names, both ancient and modern, almost as familiar in the West as at home, and thus while there is still an almost unlimited Western demand for Japanese productions of an inferior grade, there has been an increased demand for the finest products of Japanese artistic skill. Partly this, and partly the realisation by the Japanese artists of the fact that a special effort was needed to prevent their hands losing their old cunning, have tended to bring about a revival of national art that is not yet fully known in the West, but which is very remarkable in itself, and eminently praiseworthy in the manner in which it follows Japanese feeling and tradition.

No more auspicious occasion for bringing his new phase of Japanese development before the Western world could have been imagined than the Chicago Exhibition, and the Japanese Government early determined that not only should Japanese art be fully represented in all its phases, but that an art collection should be formed in which only articles of the very highest merit should be included, and which should show Japanese art in its highest development and in a manner never before attempted. In other

words, the Government's intention was not only to illustrate the manufacturing industries of Japan, but that the purely artistic side of Japanese life should receive ample and complete representation. In order to emphasise this distinction, all objects of an artistic character were roughly divided into two great classes, that of Fine Art, and that of Applied Art. The most rigid scrutiny was displayed in selecting articles worthy to be placed in the first section. Every object was carefully and impartially examined by a jury of distinguished Japanese artists, who set so high a standard, and maintained it so rigorously, that a number of pieces of very great merit were rejected altogether, or placed in the department of Applied Arts, to which every grade was admitted. In this way a collection was obtained that represented the very best in current Japanese art.

The Fine Art collection numbered some four hundred pieces, and included sculptures in wood, plaster, and bronze, carvings in wood and ivory, paintings, prints, cloisonnés, pottery and porcelains, lacquers, embroideries, textile fabrics, metal work, and architectural models, thus representing every phase of Japanese art.

The catalogue, it might be mentioned, was full of errors and misspellings, and were it not for the generally full labels the exhibits would have been almost unintelligible. No catalogue was issued by the Japanese Commission, and it was necessary, therefore, to depend upon the marvellously inaccurate and unsatisfactory one issued under the official auspices of the Exhibition authorities.

Of the carvings in wood one of the most interesting, though not the most remarkable, was "A Wrestler," by Yamada Kisai. This figure is, perhaps, as far as Japanese art can go in successfully representing the nude, and shows at once its deficiencies and its strength.

While it fails in anatomical accuracy, the muscles are boldly cut, and it vibrates with an intense effect of movement obtained by the simplest means. A carved panel by the same artist, representing an ancient military procession, is more successful because the contrast with Western ideas and methods is less marked. A group of warriors on horseback, and clad in ancient Japanese armour, fills the centre of the panel. The background is but slightly indicated, while the relief of the figures is relatively high. The detail is exquisitely done, and the

motion of the men and horses reproduced with astonishing effect and truthfulness.

Two large carved panels were shown by Telsirdo. One is called "A Royalist," and depicts three figures in armour standing by the shore. The central figure is standing and holding a sword across his forehead; the other two kneel, one on either side. The whole picture is admirably done, the detail carried out with great care, the expression stern and realistic, the surf of the sea indicated with the utmost faithfulness. The other panel is the goddess Kannon seated on a rock. The drapery of the dress is naturally arranged in rich full folds; the relief of the lower part of the picture is low, but some of the ornaments of the head-dress are wholly free. Biun Nishimura exhibited a small statuette of Kannon, in wood; the goddess carries a basket of flowers, and over her shoulders empty baskets are hung. An ivory statuette by Ishikawa Mitsutaki represented the same goddess, and was notable not alone from the fact that it is the largest ivory carving ever made in Japan, but for the exquisite manner in which the figure has been cut. The goddess stands erect in a partly conventionalised attitude, holding a vase in one hand, containing a flower. Quite as fine is another small ivory, "A Warrior," by Shimaiusa, a typical Japanese military figure striding forward with the utmost unconcern, intent only on his duty. In marked contrast to these groups was a teakwood figure of Ikkyu, a Japanese philosopher, whose object in life is to warn people of the frivolity of existence. He carries a skull to better impress his teaching, and goes to and fro calling the word "Beware" in solemn tones as he points to the skull. The figure of the philosopher is by Asahi Eizo, and thoroughly represents the grim old man, the material and subject being mutually suited to each other. The skull which he carries is of ivory, and was carved by Asahi Gyokza, and is a marvellously realistic and delicate bit of work.

Of the larger carvings in wood the most remarkable was that by Tamara Koun of a "Baboon with feathers of an eagle." The huge ape is of life size, and is partly climbing over a tree trunk, partly sitting upon it, and grasps in one hand some feathers of an eagle he has been chasing, and which has but just escaped him. The expression of the ape's countenance as he gazes after his lost prey

is conceived with great power and intensity, while the texture of the hair and of the scales of the feathers leaves nothing to be desired in adherence to the truth. The sculptor is the leading professor of wood-carving in the Government Academy of Fine Arts.

Two plaster pieces by Fujita Bunzo, one of "Temptation," the other of "Victory," were interesting, not only as works of art, but as illustrating the Japanese idea of an allegory that has been frequently treated by Western artists. The statue of "Victory" is a figure of a woman standing on a globe, which, in its turn, rests upon a monster that is crushed by its weight. The figure is calm and majestic, and holds a lotus in one hand; to the Western mind it is rather the figure of peace than of a person who has just obtained victory over a dragon. The "Temptation" group shows a hideous female with outspread wings and horns suckling an infant. The glee with which she watches the child absorb evil from her is admirably shown in her face.

In bronze one's attention was naturally centred first of all upon the work of Okazaki Sessai, who was represented by five subjects. Two of these were large panels representing dragons over water, placed at the entrance of the Japanese section. These are splendid works, executed with great boldness and originality. Another bronze panel represents Bente, the goddess of music. The figure stands against a flat background and is playing a musical instrument. The costume is richly decorated with jewels and falls in natural and graceful lines, though the relief is very low. The "Strong Man" is a remarkably powerful and dramatic figure, a man clad in Japanese armour, holding aloft a sword with which to kill a dragon already crushed beneath his feet. An eagle by the same artist is also a very fine work; but even more remarkable than this bird is a similar one by Ito Shuiro, which, though originally included in the Fine Arts section, was actually placed in the collection in the Manufactures Building. It is a superb bird, standing 2 ft. in height, and with wings that measure 5 ft. from tip to tip. The labour lavished upon this work of art is almost inconceivable, each feather being chiselled in the most delicate manner. Other remarkable bird bronzes were exhibited by Otake Norikani, but there can be little doubt but that the "Twelve Bronze Falcons," executed by Chokichi Suzuki, and exhibited by Tadamas Hayashi, were the finest pieces of bronze work in the Exhibition. The artist, Chokichi Suzuki, will be remembered as the sculptor of a bronze peacock now in the South Kensington Museum, and first shown at the Paris Exhibition of 1878. The present work, which is the idea of Mr. Hayashi, the exhibitor and designer of the falcons, consists of twelve birds, each shown in a distinct attitude, and each cast in a different metal or plated with a different alloy. In the old times twelve falcons were selected from the trained young falcons raised in the forty-eight places in which the bird is native in Japan, and which were intended for the use of the Shogun, to whom they were presented with appropriate ceremonies and decorations, which have been reproduced in the present work. It is impossible to praise the naturalness of these birds too highly. Each is quite distinct from the others, and is poised upon the top of a silk screen which enables the spectator to study them individually. The variety of expression, poise, and attitude is astonishing, no two birds being alike in these respects, and yet each one is entirely natural. The texture of the feathers is of the utmost delicacy and fineness. The work reflects infinite credit upon the artist, who has, it is said, spent four years upon it, keeping live falcons constantly by him, and thus studying them in their natural state. No finer work has been produced in modern times in Japan, and they form an enduring monument to the patience and fidelity of their creator. Gold, silver, and copper alloys are employed on some of the birds to give them

a distinctive colour, and render the group more varied than were they left in the natural bronze. This adds very much to the general effect, but without this the group is thoroughly lifelike, and each specimen marked with an individuality of its own.

In small metal-work the collection contained some notable examples, chiefly small plaques engraved or decorated in relief. The most remarkable is a small panel by the well-known artist Kano Natsuo, representing "Herons by Reeds." This is an example of what is known as *Kakakiribori* work, in which, though the lines are cut in varying depth and thickness, no part of the design stands in relief. Light and shade is produced by the depth or thickness of the lines, much as in drawing with pencil or brush. In the present example the metals employed are copper, iron, gold, and silver, the precious metals being used in details and to emphasise certain parts, as the legs and wings of the birds. It is a work of extraordinary delicacy and truth, though done on a small scale. Among other interesting examples of similar work may be mentioned a plaque by Kagawa Katsushiro, representing a group of monkeys playing with insects, gold and silver flowers being introduced as accessories; and a globular iron censer by Namekawa Sadakats, decorated with carp in low relief, with a turtle on the top chiselled with astonishing fidelity to life.

The display of paintings was large and notable, though it was, perhaps, surpassed in interest by the tapestries and embroideries. Japanese artists have of late manifested so great a tendency towards Western ideas and methods in painting that some such exhibition as the present was necessary to emphasise the fact that while this Western tendency is still shown by some painters, many other and more capable artists, inspired by the teaching and example of the Japanese Academy of the Fine Arts, are keeping to the traditional forms and methods. No greater misfortune could happen to Japanese art than the loss of its traditions. Its limitations and excellences are very well marked, and the one can always be allowed for, the other constantly appreciated. It is, therefore, satisfactory to note that the Chicago Exhibition contained only three Japanese paintings in oil which are in the Western style. None of these are devoid of interest, but they cannot for a moment be compared with the superb examples of genuine Japanese painting with which the walls of the section were crowded.

Among these latter we may particularise a few. "A Festival of Sannon at Yeddo," by Ogata Jekko, commands immediate attention by its brilliant colouring and its strong and vigorous drawing. A triumphal car is being drawn through the street, and a crowd of gaily-dressed people throng about it. The action is natural and brisk, and the work is carried out in the best Japanese manner. Quite as spirited is "A Cherry Flower Picnic in the Middle Ages," by Taniguchi Kokyo.

Among historical subjects was a painting by Kose Shoseki of the great Japanese teacher Shotoktaishi. The sage is seated at a table reading from a MS. Before him are grouped four students or disciples, and above the ceiling of the room two mythological figures float amid lotus blossoms. A "Kawanakajima Battle," by Ikeda Shinjiro, deserves special mention, because it illustrates more fully than the majority of the pictures the limitations of Japanese figure-painting. It is very large; a group of warriors on horseback, in the foreground, are engaged in vigorous conflict. There is a wonderful sense of motion in the figures, which the distorted foreshortening of the horses, the hardness of the drawing, and the rigidity of the expression of the men cannot obliterate. In the background other groups of combatants are dimly represented, the effect of distance being gained by diminishing the size of the figures and the intensity of the tones.

Of animal pieces there were a large number, many of them being masterpieces

in their way. Kishi Chikdo was represented by two notable pictures. One is a portrait of a tiger, a huge beast in a sitting posture, and about to spring up, snarling at the spectator. It is drawn in a thoroughly natural manner with great power, and was one of the most remarkable pictures in the collection.

Of landscapes, the collection contained a great variety. We may mention among others a group of six "Scenes in Nikko," by Suzuki Kason. The prevailing tone of these pictures is grey, but the series is a wonderful exposition of the power of the artist, as well as of the admirable way in which the foremost Japanese artists can transfer the most prominent realities of a landscape to paper. A snow scene shows a temple whose rich colours have not yet been concealed by the snow, and are the more brilliant and striking for the white and dreary landscape in which it is placed. Some birds supply the life of the picture. In another of the series the only colour, apart from the greys of the trees and rocks, is that of a horse on a bridge in the lower part of the picture. Above this, and the chief bit of colour in the scene, is another bridge, painted a rich red. Two other views contain temples whose complicated architectural details are drawn with the utmost delicacy and care. No other artist was so abundantly represented among the painters, and while it might be an exaggeration to term this series the most notable in the collection, it is a very remarkable illustration of Japanese landscape painting.

In a certain sense the tapestries and textile pictures surpassed in interest the paintings. Certainly, the most striking picture in the whole collection was a huge tapestry shown by Jimbei Kawashima, representing a "Festival Procession at Nikko." This picture is 13 ft. high, and 22 ft. long, and includes hundreds of figures with a rich architectural and foliage background. At first glance it seems impossible that it is not a painting, so delicate and truthful is the drawing, so varied and lifelike the expression of the faces, so rich and pure the colours. And the picture is of great merit; it is not simply an exaggerated attempt to impress by the introduction of apparent difficulties and complications. It is as legitimately a work of art as any painting. The fabric is what is known as Tsuzure Nishiki tapestry, in which the weaving is chiefly done by hand, the part taken by machinery being very slight. The cross threads are adjusted by the fingers, and finally put into position by a comb-like instrument. Quite four years' constant labour is stated to be necessary to produce a work of this size, which requires the most skilful workmen; but by employing several sets of weavers simultaneously, and working day and night, it was finished in two years.

The scene, as has been hinted, is one of great brilliancy. In the background the great temple stretches across the picture. The architectural details are drawn with perfect fidelity, and the rich and somewhat sombre colour of the building—chiefly brown and gold—forms an admirable background for the brilliant procession issuing from the gates. The temple is placed in the midst of trees, whose foliage is drawn with the utmost truth and beauty of shade and colour. The procession, for which the rest of the picture is only a background, emerges from the temple, descends a broad flight of steps, turns to the extreme left, and then sweeps across the foreground to the extreme right. The number of figures is prodigious, and the colours of the costumes are exceedingly rich and varied, those in the back being of a white or light colour, while reds and yellows and blues are chiefly reserved for the larger figures at the head of the procession, and nearest the spectator. The whole work is most admirable; the architectural setting is a fitting background to the brilliant scene enacted before it; the arrangement of the procession, and the manner in which it is


brought across the entire front of the picture, without being in the least forced, is masterly in the extreme. No such Japanese tapestry has previously been seen out of Japan, and it is doubtful if its equal will be seen soon again, if at all.

The collection of porcelain was not large, and, in fact, would have been quite insignificant were it not for two special collections. One of these was a private collection of one hundred pieces exhibited by Hayashi Tadamasa, chiefly small colour pieces of great variety and richness. The other was a collection of 150 pieces by Takemoto Hayato, exhibited by Nimikawa Soske. This celebrated potter died but a little more than a year since, and as his secrets of manufacture died with him, the collection contained almost all of his work that is ever likely to be brought together. In cloisonnés the most striking examples were three magnificent examples shown by S. Suzuki, two vases, 8½ ft. high, and a censor only a little shorter. They are the largest examples of cloisonné ever made in Japan, and are worthy of attentive study, not only on account of their remarkable size, but for their decoration and the fine manner in which they have been executed. Parts of the vases are not satisfactory. The designs of the handles and the ornament applied at the base and at the top of each, and especially the crowns with which they are finished, have rather a tawdry effect. But apart from these features the vases are very fine. The shapes are good, the designs striking and original, the colours rich and truthful, and the three specimens form a magnificent illustration of the resource of Japanese art. Strangely enough the designer, instead of contenting himself with designs purely Japanese in meaning and in execution, has sought to represent subjects which, while purely Japanese in form, would have a symbolical and allegorical meaning that would be apparent to Western minds. Starting with the idea of indicating the five nations chiefly interested in Eastern Asia he has given symbolic meanings to his leading features. One of the vases is decorated with dragons; this personifies China, or, if you choose, Summer, for a double meaning is attached to each part of the designs. Two eagles, which form the leading motif of the front of the other vase, typify Russia and Autumn. A group of chickens on the censor typifies Corea, or Spring, while the rising sun in the same view stands for Japan. On the reverse of the vases different scenes are shown. On that of the eagle vase, a winter scene; on the dragon vase, water and small birds, with a full moon; on the reverse of the censor, a blossoming cherry tree. The eagle of the censor typifies the United States, which is further hinted at in silver stars, placed on red and white horizontal stripes, which form the decoration of the necks of the vases. The three form a single group that has been most ingeniously designed and marvellously executed. Though the symbolic meaning attached to the designs may not be as evident to Western minds as the designer hoped for, there can be no question at all as to the very great merits of the vases as works of art.

The collection of lacquer work was small, but it included some interesting examples. Like other departments of the collection, it illustrated, in a very marked degree, the fact that Japanese art is still able to hold its own in its own specialties, notwithstanding the enormous number of spurious works that have flooded the Western markets. Morishita Morihachi was represented by four examples, all masterpieces of their kind, of which two boxes may be specially mentioned. One is decorated with butterflies and flowers, the other with fans on a black ground, each fan being decorated with a landscape of wonderful delicacy and minuteness. Most of the lacquered specimens were small, a fact which but further emphasises the care bestowed upon them. The largest object in the collection was a cabinet by Morimura Ichitaro, decorated with landscapes.

The collection comprised several architectural models: one representing a palace in Shizuoka, the others, three in number, temples, or parts of temples. All of these are superb pieces of work, executed in colours, with the carvings and metal work reproduced with the utmost fidelity. Like many of the wonderful things in this wonderful collection, it is impossible to speak too highly of their workmanship.


THE EASEMENT OF LIGHT AND THE RIGHTS OF THE CROWN.

E suppose that a good many persons, though they are aware that the Crown is the owner of a considerable quantity of landed property, do not trouble themselves in the smallest degree as to the effect of this ownership upon the proprietary rights of other people. It is obvious, however, that so far as regards the right to light—one of increasing importance in these days—owners of buildings adjacent to property held by the Crown or in the possession of its lessees must be careful that they are not living in a fool's paradise. The Prescription Act gives an indefeasible right to light over the servient tenement after an enjoyment of twenty years. This is the effect of the second section of that statute, and we do not hesitate to say that there is a popular idea that after twenty years' enjoyment, the owner of the dominant tenement has a right against all persons, whether against subjects, against the Crown, or against the Crown's lessees. We may say, however, without beating about the bush, that this view, so far as regards the Crown and its lessees, is now wholly wrong, though it has been left for the Court of Appeal in the present year to decide this definitely and clearly. In 1891, Mr. Justice Chitty decided the case of *Perry v. Eames*, in which he held, after an elaborate argument, that the Crown was not bound by the Second Section of the Prescription Act, not being named in it. As the Judge pointed out at the time, the decision had "an importance extending beyond the interests of the parties engaged in the litigation." It was not appealed against, and, therefore, stood as laying down the law. In the present year, however, in the case of *Wheaton v. Maple & Co.*, the same point arose, and it was decided, as could hardly be helped, by Mr. Justice Kekewich in the same manner as it was by Mr. Justice Chitty. This case, however, was carried to the Court of Appeal, and it was in a sense an appeal also against the decision in *Perry v. Eames*. But the Court of Appeal decided the question in the same manner as the two Judges of the Chancery Division. "In *Perry v. Eames*," said Lord Justice Lindley, "it was decided that though parts of the Statute (the Prescription Act), namely, sections 1 and 2, bind the Crown, yet section 3 does not, the reason being that the Crown is expressly mentioned in sections 1 and 2, and is not mentioned in section 3. Upon reflection I am of opinion that the decision is correct." Section 3, continued Lord Justice Lindley, is an enactment, so to speak, standing by itself, dealing and intended to deal only with the easement of light, which, therefore, is excluded from the effect of the previous sections. It is important that this statement should be noted, for in addition to what may be termed the direct attack on the decision of the Court below in *Perry v. Eames*, an attempt was made to upset it by showing that *both* section 2 and section 3 applied to the easement of light. If the plaintiff could have succeeded in making good this contention, he would have obtained a right against the Crown under section 2. But in this he failed, for once it was decided that section 2 contains all the law in the statute in regard to the right to light, away went any right against the Crown. But it was further argued that though there might be no right against the Crown, there was a right as against its lessees, and Mr. Justice Kekewich

agreed with this argument. But the Court of Appeal held that as there was no right against the Crown, there could be none against its lessees so long as the lease under which they held was in existence. Adopting the reasoning of Baron Parke, given forth more than fifty years ago, the Court of Appeal held that "No title at all is gained by an user which does not give a valid title against all;" in other words, a person cannot obtain an absolute and indefeasible right within the meaning of the Statute unless by the user he can get a right against all.

So much for the law of the question, which is clear and comprehensible. But if we look at facts, it is obvious that the result is an anomaly and a hardship. For example, we may have two houses side by side, of which the windows overlook private property, whilst the windows of the other overlook property in the occupation of a person who holds under a lease from the Crown, as do *Maple & Co.*—as regards part, at any rate, of their premises, as appears from the case previously referred to. Each house may have enjoyed the light without interruption for a longer period than the statutory term, but the result is very different. For whilst the light of the one house cannot be interfered with, the light of that which overlooks the Crown land may be at any moment obstructed, with the further result that the value of the first premises may be double or treble that of the latter block. But in these days the possession of land by the Crown ought not to give a higher right against neighbouring owners than the possession by private individuals, more especially when the actual occupiers are private persons holding a lease from the Crown. There are some who regard the law by which an indefeasible right to light is gained after twenty years' enjoyment as wrong in principle and injurious in practice, but as long as it remains the law it should apply as much to the Crown and its lessees as to private persons and their lessees. Considering that some easements, such as rights of way, can already under the second section of the Prescription Act be gained against the Crown, it is clear that the only thing which is required is an emendation of the third section by making the right to light indefeasible after twenty years' enjoyment, as well against the Crown and its lessees as against private persons. The law as it now stands causes anomalies in practice, arising out of legal fictions, and it gives to lessees of Crown lands a larger measure of enjoyment in diminution of the enjoyment of dominant tenements than is obtained by lessees or owners in fee of servient tenements, in regard to which the Crown has no right of ownership.

NOTES.

ONSIDERING the large area affected by the earthquake which visited Wales and adjoining English counties on Thursday, the 2nd inst., it is rather astonishing that so little damage was done. Beyond shaking doors, windows, household ornaments, &c., no serious effects were felt and no lives were lost. The time of the occurrence is variously stated as between 5.40 and 5.50 p.m.; and records of more than one shock during that interval are at hand. In Wales, the disturbance extended from the Vale of Clwyd, the Vale of Llangollen, and the north-east coast through Merionethshire, Cardiganshire, and Pembrokeshire, to Carmarthenshire and Glamorganshire; Anglesea, Carnarvonshire, and some parts of west central Wales seem to have escaped. In England, it was felt in Cheshire, Shropshire, Herefordshire, and Gloucestershire, as well as in Somerset and Cornwall; and in Ireland, in County Wicklow. The most severe shocks were experienced, apparently, at Carmarthen, Pembroke Dock, Milford Haven, and in other towns in South Wales. On noting the positions of places where the disturbance was manifested,

and consulting a geological map, it becomes at once evident that the Upper Palæozoic and Lower Mesozoic strata are the formations chiefly involved, and of these the Carboniferous series appear to have been most conspicuously affected. Nevertheless, the Lower Palæozoic in the neighbourhood of Carmarthen and Cardigan were materially shaken; whilst, on the other hand, the Triassic and Liassic beds experienced the shocks over a considerable area. With reference to the two last-mentioned series, however, it may be mentioned that in some of the districts reported to have been disturbed (*e.g.*, parts of Gloucestershire and Somerset) they are very thin, and lie directly on the Carboniferous and Devonian strata, which seem to have transmitted the movement to them. So far as the South Wales and Bristol and Somerset areas are concerned, they are practically formed of a denuded mountain range, and it is by no means the first time that earthquakes have visited them. Only in August of last year the whole district was severely shaken, and the effects were more powerful than those of Thursday week. Earthquakes are much more numerous in England than most people are aware of; it would be interesting to know what districts are most frequently visited, as distinguished from those which enjoy comparative immunity from these earth movements.

WE cannot see how anyone with the slightest degree of confidence in the justice of his case could take exception to the first proposal made by the coalowners at the abortive conference last week, viz., that, pending the final settlement, work should be immediately resumed, and that 15 per cent. off the 40 per cent. advance should be held in reserve, and banked to the credit of a conciliation board, to abide by their decision. This suggestion, however, the Federation representatives declined to entertain, and it is only fair to add that the men—who, it would have been supposed, would be only too glad to be at work again on such honourable terms—seem to unanimously endorse the action of their leaders. The failure of the negotiations last week leaves the matter in a most unsatisfactory state, each side blaming the other for the breakdown; but the conference may be said to mark a step in the direction of a settlement, inasmuch as the rigid attitude of the combatants, so long maintained, has been, to a certain extent, modified. The counter proposal of the miners, though clearly shown to be unworkable, places the "irreducible minimum" at 30 per cent. above the 1888 standard instead of 40. The proposal reads "that the minimum or standard rate of wages be 30 per cent. above the wages rate of January 1, 1888." A standard rate, as a basis from which wages advance or recede in accordance with the irresistible forces controlling supply and demand, is no new thing, but a *minimum* such as that proposed, fettering trade, would be very different. The proposed Board of Conciliation, to which the men appear so unwilling to trust themselves, would consist of an equal number of representatives of owners and miners, who would themselves choose a chairman-umpire; or, failing agreement, allow the Speaker of the House of Commons or some high authority to make choice for them. Mr. Chambers, on behalf of the coalowners, declared that their suggestion was not to be looked upon as a hard-and-fast proposition, and that they were quite willing to form a Board of Conciliation on any lines that could be agreed upon between the two parties. It is difficult to believe that there is no possibility of agreeing upon a tribunal which would command respect and give an impartial award, although it is pretty certain that a long inquiry would be necessary;—hence the desirability of some temporary arrangement such as that suggested, to allow of work being resumed at once. It is to be feared that the men are rather misled by the sympathy which the

distressed condition of their families has naturally evoked, and by the language of some of their leaders—which presents a striking contrast to the amicable assurances of the delegates at the Conference. "We believe that you desire to pay your workmen a fairly good wage," said Mr. Pickard; and it is a great pity that he makes no attempt to bring the men round to a similar faith.

IN view of the Home Secretary's reply to a recent deputation foreshadowing the probability of a considerable increase in the number of factory inspectors and of the future registration of workplaces, the Sanitary Institute have arranged for a series of useful lectures on the sanitation of industries and occupations, and the first of these was given on the 2nd inst. by Dr. Arthur Newsholme, Medical Officer of Health for Brighton. The lecturer referred to the difficulties of classifying occupations, the number of distinct industries in this country being so large, and said that the only method of taking death rates that could be properly compared with each other was by calculating the death rates for each occupation at each separate age period, and then applying the death rates to a population with the same age distribution in each industry. As to the comparative mortality of men in different occupations between the ages of 25 and 65, a table was shown, giving a standard of 100 for clergymen, and the following death rates in other occupations: Agricultural labourers, 126; commercial clerks, 179; tailors, 189; and bookbinders, 210. A comparison was also made of the death rate in outdoor and indoor work, and the balance was shown to be greatly in favour of outdoor work in industrial occupation. As to life in rural and urban districts, taking the rural death-rate at a standard of 100, the figures for the urban parishes during the last four decades have been 124, 126, 122, and 117 respectively, showing that the mortality was greater in urban districts than in rural. The well-known fact that, of the diseases of daily life, phthisis is the most fatal, was mentioned, and the lecturer said that in proportion as people were engaged in indoor work, so was the tendency to that disease increased. The new scientific theory as to the cause of phthisis was dealt with, the lecturer stating that the infective matter is inhaled, in the majority of cases, as dust from the dried expectorations of phthisis subjects. In view of these facts every workshop should be treated with a disinfecting fluid, and the habit of spitting upon the floor prohibited; views which we heartily endorse, although we fear that the mere prohibition of the habit referred to will scarcely operate in the desired direction. An interesting table was shown, compiled from Dr. Ogle's statistics, indicating that vitiated air was largely responsible for consumption. According to Dr. Ogle, taking a standard of 100 for fishermen, the death-rate amongst carpenters and joiners is 103 for phthisis and 67 for other lung diseases; file-makers, 219 and 177; masons, 127 and 102; stone and quarrymen, 156 and 138; pottery makers, 239 and 326; Cornish miners, 348 and 231; and coal miners, 64 and 102. Thus the dust inhaled by carpenters and joiners is comparatively innocuous, while the metallic dust from file making caused nearly four times as many deaths as amongst fishermen. The evils of working in cramped positions were touched upon, as well as the effects of variation of temperature in workshops, such variations being only of secondary importance in the development of consumption, unless they were accompanied by impure atmosphere and the inhalation of dust particles. The lecturer also referred to cancer in relation to occupation; and drew attention to the encouraging fact that there has been a decrease in accidents in different occupations of 16·7 per cent. from 1858 to 1886—a diminution which was due, in his opinion, to the beneficial influence of factory legislation. Reference having been made to the

evil effects of protracted work, the lecturer spoke, in concluding an exceedingly interesting and valuable lecture, of the responsibility of employers in providing efficient ventilation and warmth in their workshops, as well as in removing from them, as far as possible, all dust particles.

THE drawings and photographs of Egyptian remains at El Kab, made by Mr. J. J. Tylor, Mr. Harold Roller, and Mr. Somers Clarke, now on view at the rooms of the Society of Antiquaries, are a valuable addition to the illustration of Egyptian antiquities, chiefly in regard to wall paintings. The copies of the latter have been made with the assistance of photography as a basis, on which the drawings have been worked up afterwards, some in colour and some in monochrome, to represent the effect of the originals. Mr. Somers Clarke's chief contribution consists of measured drawings of the Temple of Amenhetep, an oblong chamber with four central columns, furnished with heads which are supported by a pilaster-like projection on each face of the column. The drawings are supposed to be illustrative of Egyptian life for about 1,000 years previous to the time of Joseph and the Exodus. A portion of the illustrations will be embodied in a volume on "The Wall Drawings and Monuments of El Kab," to be brought out by Mr. Tylor and Mr. Somers Clarke.

IT is proposed to collect subscriptions—Oxford University gives 200*l.*—for restoring, at an estimated cost of 1,500*l.*, Archbishop Sheldon's monument in the parish church, St. John the Baptist, Croydon. The monument, with others, suffered greatly in the fire which, on January 5, 1867, destroyed all of the fabric except its tower and outer walls. Gilbert Sheldon, Warden of All Souls College, and founder of the Sheldonian Theatre, Oxford (Wren's first completed work, *teste* Elmes), builder of Lambeth Palace library, and a munificent contributor to the rebuilding of St. Paul's, died in 1677, in his eightieth year. His monument, of black and white marble, was erected in St. Nicholas's chantry in the old church, which is believed to have been begun by Courtenay, elected Archbishop of Canterbury in 1381, and finished by Chicheley (whom Stow calls its "new builder, or especial repairer"), *ob.* 1443. Carved in an age when monumental sculpture had declined, it was for long considered to be by foreign artists, but Vertue discovered that it was by Joseph Latham, City Mason (or Surveyor), and one Bonne, and completed by English workmen. The effigy's head, now defaced, was very fine; but the portion that attracted most admiration consisted of emblems from which a later age turns with disgust—skulls, bones, worms, winged hour-glasses, and the like, all carved with singular fidelity and perfection. These are ranged along the black marble sarcophagus on which the archbishop lies, recumbent, resting upon a cushion, dressed in robes and mitre, with pastoral staff in his right hand. An oval inscription slab, surmounted with his own and the see's arms impaled, supported by cherubim, a pediment, and urn in flames, rise above. This memorial, which Evelyn says cost between seven and eight hundred pounds, is illustrated, with details, by Mr. J. Corbett. Anderson, in his work upon the church and its monuments: see our Volume XXIX, p. 759. Here also were buried Archbishops Grindall, Whitgift, Wake, Potter, and Herring; Alexander Barklay, translator of Brandt's "Ship of Fools" (1552); J. S. Copley, painter; and L. N. Cottingham, architect. A church is supposed to have existed on this site in Saxon times, on the authority of Domesday Survey, and the circumstance that Ælfric, priest of Croydon, witnesses a will of 962 A.D., printed in Lambard's "Perambulation of Kent." The late Sir

G. G. Scott rebuilt the church after the fire; the chancel was lengthened 18 ft., new windows and a west door were put in the tower, which is 29 ft. square at the base, and rises in five external stages to a total height of 121 ft., including the pinnacles. In 1838, the governors of the Whitgift Charity, in this borough, restored Whitgift's tomb with its effigy, and a window to his memory was unveiled in that year.*

THE German Imperial Budget for the financial year 1894-95 will include the first vote on account for the proposed national monument to the late Emperor William, which is to be erected on the Berlin "Schlossfreiheit." As neither the proposed position of the monument nor its design have found much favour, there will probably be much discussion as to the financial question of the unfortunate scheme, for which the present Emperor must be held responsible. When Emperor William II. took such arbitrary steps as to the location and design of the monument, it was generally supposed that he considered the proposed memorial more as a private one, the cost of which the Hohenzollern family would defray, or at least materially subscribe to. Apparently, however, this is not to be the case, and the Emperor will hence practically be forcing the "Reichstag" to spend the country's money on a class of monument which the majority of his countrymen have no sympathy with, and the locality of which (*i.e.*, within the walls of the old Prussian capital) finds no favour in Bavaria, Saxony, and the minor German States. The locality of the monument, as we have before stated, will be on a site bought some time back with the proceeds of a special lottery, by which some five million marks, or about 250,000*l.*, were raised. Now the country as a whole will have to pay another eight million marks, or 400,000*l.*, for the monument proper, with its architectural surroundings. The foundations on the selected site will alone cost 900,000 marks, or 45,000*l.*; the equestrian statue, with its base, will cost 90,000*l.*; the architectural surroundings 80,000*l.*; and the sculptural decoration of these surroundings 25,000*l.* The general expenses, sculptor's fees, &c., are estimated at 60,000*l.*, and the fortunate artist through whose hands everything pertaining to the design will pass is Herr Begas, whose new gigantic fountain on the Schlossplatz the Emperor considers to be the ornament of his city. The sculptor's architectural surroundings, it is true, are to be revised by Herr Halmhuder, a young architect who in this case has supplanted Herr Ihne, the Court Councillor.

THE last-issued number of the *Architectural Review* (Boston, U.S.A.) contains the conclusion of the article by Mr. H. Langford Warren on "The Use and Abuse of Precedent," accompanied by some significant examples of the use of precedent in the shape of photographs of ancient buildings and some modern buildings in America for which they have served as models or suggestions. One of the best examples is that of the Librairie Ste. Genevieve at Paris and the New Public Library at Boston. That the one is imitated from the other no one could doubt for a moment, but there is quite sufficient special treatment in the Boston building to relieve it from the charge of copyism. Whether we should feel quite so certain as Mr. Warren does that it is an improvement on Labrousse's building, is another question. Mr. Warren's conclusions are that while work that is merely imitative of past art is unprogressive and abortive, on the other hand "work that either on ignorance or of purpose attempts to dispense with precedent altogether, or which uses the forms of past art without an intelligent knowledge of their meaning, is neces-

sarily not only ungrammatical, but incoherent, formless, and ugly: it is to architecture what the gibbering of an idiot is to language." This is forcibly put and there is a good deal of truth in it, though the logical correctness of the parallel between architecture and language may be questioned; at all events it is a parallel that must not be pushed too far. As to "dispensing with precedent altogether," we believe that is impossible to the mind of man; the ideas of every man are the result of cause and effect, like all other natural phenomena; however a man tries to abstract from his fancy all the influence of previously-existing forms, when he tries to design something "entirely original" it will always turn out to have some basis in what he has already known and seen. The mind cannot "think away" the influence of previous impressions.

THE lecture by Mr. William Morris on "The Printing of Books," delivered at the Arts and Crafts Exhibition on Thursday evening last week to a crowded audience, was perhaps chiefly remarkable as an example of Mr. Morris's extraordinary versatility and activity of mind, in the way he takes up and deals with one subject after another, and masters each one. It is certainly a remarkable phenomenon to find a man who has produced the only contemporary epic poem worth speaking of, and has effected a revolution in furniture and textile design, appearing now as an expert in typography, and the master of a printing-press from which some of the most beautifully-printed books of the day are produced. The chronological succession of specimens of printing shown by the aid of the lantern was most interesting, and we were glad to notice that Mr. Morris at the outset of his lecture admitted that typography which attracted too much attention, from its design, was out of keeping with high-class literature; a theoretical admission which some productions of the Kelmscott press do not practically illustrate. Mr. Morris mainly dealt, however, with the effect on the page of well-designed or ill-designed letters, and of the proper position of the type on the page. We agree with him that the latter point is of importance, and the proportionate graduation of margins is a matter to be carefully observed; but we utterly dissent from the proposition that the double page (right and left pages taken together) is the "unit" of a book, and not the single page, and that, therefore, there is to be little or no margin on the inner edges of the pages, so as to mass all the type surface together. The result of this, of course, is practical inconvenience in reading the inner portion, especially in a newly-bound book, where it is impossible to get the centre flat. In such a case what is impractical is inartistic, nor do we believe there is any better reason to be given for this recommendation than a mere fancy for archaeological precedent.

IN reference to the recently-erected Westminster Guildhall, a few facts about which will be found set down in our column of General Building News, we thought it would be of practical interest to our readers to have some definite statement as to the cause of the unusual efflorescence on the bricks (which must have attracted the notice of every passer-by when the building was just completed), and the steps taken to get rid of it. We accordingly communicated with Mr. Pownall, the Surveyor to the Council and the architect of the building, in regard to this. He replies that in his opinion the efflorescence arose from the natural salts in the clay of the bricks being acted upon by the Portland cement which was used throughout the building, and drawn to the surface of the walls at one time owing to the great heat to which the exterior was subjected during the exceptional weather of last summer. Holding this

opinion, Mr. Pownall advised the Council against using any artificial means to clean the bricks, which have now, by the action of rain and atmosphere, regained their proper colour and appearance. It is interesting to know that the brickwork, which had such a very bad appearance not long since, has cleaned itself. Comparing the former appearance of the building with the present, we were under the impression that vigorous artificial cleansing must have been used.

THE Clerkenwell County Court was witness last week to a satisfactory decision under the Artisans' Dwellings Act, by which a jury held that premises near Essex-road, belonging to one Thomas Buckland, of 495, Old Kent-road, were unfit for human habitation, and gave the plaintiff 28*l.* damages. The defendant was obviously a hardened offender, since he had previously been fined 20*l.* for disobeying an order of the Vestry to execute certain sanitary repairs. It is unnecessary to state the various insanitary details. A doctor who was called described going out into the basement as being "like putting your head into a sewer." It was proved also that two children died of typhoid fever contracted in these premises. But such facts show that much closer inspection of insanitary dwellings is required in the metropolis, and it is equally certain that imprisonment, and not a fine, should be the punishment of any person who is proved to have let dwellings unfit for human habitation. We are aware that the proceedings on which we have commented were of a civil character, but the law should be reformed on this point so that a prosecution may follow such a verdict as the above. To keep buildings in such a state that the habitation of them causes death is little better than deliberate murder.

WE hope we may be excused (copyright notwithstanding) for quoting in full the following verses from *Punch* of this week in regard to the Law Courts; they sum up so very well, in a light vein, the merits and demerits of the building, that we should like to put them on record in our columns:—

"THE CENTRAL HALL OF THE LAW COURTS.
O BARRISTERS' wigs from far and wide
You gather anew!
The Strand, like meadow with daisies pied,
Is dotted with you.
You crowd the courts, so stuffy, so small,
So awkwardly placed;
You don't go into the Central Hall—
Magnificent waste;
That thing of beauty was meant to be
For ever a joy,
Just built to accommodate, as we see,
One messenger boy.
Proud emblem be of the empire's might,
That thus, for a whim,
Spent pounds in thousands with such delight
Just to shelter him.
The courts are draughty, the courts are dark,
The passages small,
And witness, client, solicitor, clerk,
Are squeezed in them all.
Those lancet windows on winding stairs
Don't help one to see;
A falling Commissioner even swears
Without any fee.
Still though we stumble and though we're squeezed,
We all recollect
That deserted Hall, and we're truly pleased
With its fine effect.
The vacant acre of paving there
Should never annoy,
It has one occupant, we're aware—
That messenger boy."

For all that, we cannot regret the building of the Hall. It may be of little or no use to the lawyers, but it has added a piece of architectural scenery to London, a grand interior into which those who are fortunate enough to have no business at the Law Courts may turn in sometimes and refresh their minds; and if, as *Punch* says, it was meant to be "for ever a joy," it has at all events not failed in that respect.

* For more particulars of the church, and Scott's restoration, see our volumes for 1867 (p. 25), 1869 (p. 231), 1870 (p. 63), and 1871 (pp. 750, 761, 766); and our number May 26, 1885.

THE first of the "James Forrest" lectures, established by the Institution of Civil Engineers in honour of their able and long-tried Secretary, was delivered on May 4 of this year (the anniversary of the day on which Mr. Forrest was elected an Associate of the Institution) by Dr. Anderson, F.R.S., and is now issued in a pamphlet form.* It is a masterly and philosophical essay on the subject of "The Interdependence of Abstract Science and Engineering." The object of the lecture is, as the title suggests, to point out the connexion of abstract scientific speculation and study with the ultimate practical results of engineering. It is a paper not only containing much thought in itself, but likely to be the cause of thinking in others. While mentioning it, we may also congratulate Mr. Forrest on the recognition of his services by the Institution in thus connecting his name with a series of important lectures; while the feeling which prompted such a recognition is equally honourable to the Institution.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

THE PRESIDENT'S ADDRESS.

THE opening meeting of this Institute for the present session was held on Monday evening last at No. 9, Conduit-street, Mr. J. Macvicar Anderson, President, in the chair.

Alliance with Provincial Societies.

The President announced that the Council proposed to admit to alliance with the Institute two provincial societies—the York Architectural Society, and the Cardiff, South Wales, and Monmouthshire Architects' Society. These two societies had some time since applied for alliance with the Institute, and their constitutions and rules had virtually been revised in order to bring them into such a position as to qualify them for alliance with the Institute. The advantage of assimilating the organic rules and declarations of the members of the allied societies to those of the Chartered Corporation of London could not be doubted, and therefore he had pleasure in formally moving "That the York Architectural Society, and the Cardiff, South Wales, and Monmouthshire Architects' Society, be admitted to alliance."

Mr. Charles Barry seconded the resolution, which was put and agreed to.

The President's Address.

The President then delivered the opening address of the session, which was as follows:—

Those of you who were good enough to honour me with your presence at the opening meeting of last session may remember that the keynote which pervaded the address it was then my privilege to deliver was Progress, and from that standpoint I noticed some subjects of professional interest. Progress leads to Attainment, and it is therefore a natural sequence to pass from the means to the end, and from the higher platform to review some points that may be supposed to interest the architect, and less directly the public.

No one who regards life as a serious reality fails to set up some goal, in the attainment of which life is passed. The goals of some wither with possession—the object is too material, attainment too easy. The noblest, as well as the happiest, lives are passed in the pursuit of an ideal, the standard of which is so lofty that it is never fully attained. Point after point may be gained, each one higher than the last; but, as with the Alpine climber, ever in front is displayed the as yet unattained expanse of excellence, which for the architect is enshrined in truth and beauty. And so it comes to pass that in such aspirations the oldest men are still students, because their ideal of excellence is so lofty that life is too short to attain it. But, just as the highest life is sustained and inspired by hope, which can alone find full fruition hereafter, so the life of the artist is enabled by the yearning for the attainment of excellence, which no disappointment can extinguish, and no success can satisfy. This is the art life worth living.

Architects, however, are sometimes reproached with incapacity because they fail to attain an ideal which the public choose to establish. Such reproach has often been cast at the architects of this century because they have not created what is called a new style of architecture. No indication is vouchsafed of what is meant by those words, probably because no reflection has been

* To be obtained from the Institution of Civil Engineers.

bestowed on the subject. It is sufficient to censure a body of educated men by accusing them of want of originality, and of slavishly copying the works of others. In order to meet the accusation, it is necessary to apprehend what architecture is. When men began to multiply on the face of the earth, when they had to work, when they founded communities, when they erected buildings to provide for their necessities, and when such buildings were constructed with regard to beauty of form and proportion, architecture was born. Thus, architecture is the product of the necessities of life coupled with the aspiration for the beautiful. The development of this germ has found expression in the buildings, monuments, and shrines of succeeding generations; and what are known as styles of architecture are simply the adaptation of this germ to climatic influences and conditions of life in different parts of the world. With the modification of such conditions they become subject to variation. Thus, the architecture of feudal times, when warfare was the rule, not the exception, was characterised by massive solidity, unbroken wall-space, dimly lit openings, and bald simplicity. Such characteristics, necessitated by the hardy severity of a warlike age, would obviously be ill adapted to the advanced civilisation and luxurious refinement of these days of peace and accumulated wealth; and so solidity gives place to lightness, wall-space to fenestration, simplicity to ornamentation.

If, then, architecture is the outcome of actual conditions of life, it follows that to create a new style is beyond the power of any individual or any body of architects, no matter how bountifully he, or they, may be endowed with the power of original design. Are the conditions of life in our day distinctively different from those which prevailed in the days of our fathers? Our climate, much as it is abused—and, as I think, unjustly—remains much the same. We eat, we drink, we work, we sleep, we marry and are given in marriage, and in all essential conditions we live and die as our ancestors have done before us. Is it, then, reasonable to anticipate the advent of a new architecture? Cause and effect are inseparable. With new conditions of life, a new architecture will be called into existence; but so long as the conditions of national life remain unchanged, it is as absurd as it is illogical to traduce the architects of this age for having failed to attain to the creation of a new style of architecture.

But it is alleged further that our system of education, and, resulting from that, our programmes of examinations, tend to rivet the chains that bind and restrict us to the past; that we inculcate the study of schools of architecture which were called into being by conditions that no longer exist; that we teach forms and proportions defined by masters in such schools, which were beautiful because appropriate to the conditions of life in their day, but which are not appropriate, and therefore not beautiful, now; that we encourage the student to paraphrase Greek, Roman, Romanesque, Gothic, Saracenic, Renaissance, Hindoo, Burmese, Siamese, or Chinese art; that historic styles have nothing to do with architecture; that English composition, geography, history, Latin, Greek, or German, have no connexion with it—in a word, that we look on the essentials as unimportant, though most rigorously insisting on what is of no use. Instead of this, we are told that we should inaugurate a system of education and examination that would not disturb the oblivion of the dead past, but that would tend to develop native power by encouraging students to realise the actual requirements of a living age, and to design forms and proportions such as may be best adapted to them; that if we want to test real progress we should see what students can make of a storey-post, a cast-iron column, a wrought or cast-iron girder; how they can adorn a door or window, or group them; if they can light efficiently or aesthetically when light is only wanted to produce a mental impression; or if they know what forms and proportions are good for sound.

In this and in all such representations there is, no doubt, much that is plausible and calculated to attract and captivate the unthinking; nay, more, there is much in which we cannot but concur. We all desire to encourage and to develop original power. It is inevitable that those who cherish the architecture of a past age to which they are passionately devoted, and which in their judgment is not inapplicable to the wants of the present day, should exercise an influence on their pupils and assistants in the direction of their preference; but it by no means follows that preference for forms or features which a past age admired and practised restricts the development of native

power. Is it not apparent that such representations as I have referred to rest on a fallacy? The inferred assumption is that originality may be the product of education. Now, individuality—that which educates original work, instead of reproducing the work of others—is a natural endowment which education and examination can neither create nor smother. That it is rare is demonstrated by the fact that in Art, as in other callings, the possessor secures a following, and founds a school. The majority of men are only too willing to follow where one master-mind leads. The fact of having studied and been imbued with admiration for proportions and forms which are the legacy of a past generation will not prevent originality from finding expression; nay, it is certain that creative power will in no sense be injured, but rather refined, by the study of beautiful forms and chaste proportions attained by past masters of the art, and by the principles on which such forms and proportions were based. If it be true that Latin and history have no connexion with architecture, it is in the same sense true that the dead languages have no connexion with the life's work of most of those who are taught them; but experience has proved that such teaching is the best possible mental and educational foundation on which to rear the work of life; and it would be as absurd to banish the teaching of Latin or Greek from our schools, as to exclude a knowledge of Latin, French, German, or history from the education of architectural students. The more highly educated our students are—not merely in technical training, but in respect of general attainments and a familiar knowledge of the past—the better will it be for the future of architecture. Sir Joshua Reynolds has well said: "He who is acquainted with the works which have pleased in different ages and different countries, and has formed his opinion on them, has more materials, and more means of knowing what is analogous to the mind of man, than he who is conversant only with the works of his own country." In the same relation, the gifted President of the Royal Academy addressed to students words as eloquent as they are true when he asked them "to believe that the gathered experience of past ages is a precious heritage and not an irksome load, and that nothing will better fortify them for future and free development than the reverent and the loving study of the past."

And if it be right that the education of architectural students should be not merely technical but liberal, does it not follow that an examination which is established for the purpose of testing the knowledge which they ought to possess should be coextensive? The range of subjects embraced in the study of architecture is wide, because there are so many cognate subjects of which it is essential to know something; and, further, because it is desirable that the professor of a fine art should not merely be technically an expert, but that he should be also a man of refinement and culture. I have little sympathy, therefore, with the carping criticisms that occasionally reach me respecting the details of our scheme of examinations. The experience which can alone be acquired by time will no doubt lead to the modification of some, or the expansion of other features. No one has been so foolish as to claim perfection for a scheme which is as yet in its infancy. I confess, however, that to my mind the fact that there has been so little remedy, and that the scheme has already met with so large a measure of success, speaks volumes for their wisdom and the enlightened foresight of the Board of Examiners and of their Chairman. Some of you, indeed, have thought—and I confess to having sympathised with you—that too little prominence has hitherto been attached to the subject of design; but the Board of Examiners have evinced their desire to meet any legitimate objection by extending, as they have now done, the time to be devoted to this important subject from six hours to two entire days out of the six days to be occupied by the final examination, as compared with half a day to be given up to history, architectural features, hygiene, materials, construction, and specifications and professional practice, respectively, the sixth day being devoted to the oral examination. This is a change for the better, which will no doubt be appreciated by students, and which meets with my entire concurrence. I should, however, deplore any undue limitation in our progressive Examinations, in respect of literary or historical subjects, which are not only of vast utility in themselves, but are essential elements in the equipment of one who aspires to be qualified as an architect to take his place with men of education and learning.

It is alleged, as I have said, that the architects

of our day are devoid of originality because they have not created a so-called new style of architecture, and that our system of education and examination is defective because it restricts the encouragement of native power and rivets the chains that bind us to a dead past. Let the result be judged by its fruit. If these allegations be true, the result would be apparent in the architecture of the day, which should be tame, insipid—a slavish reproduction of dead forms and proportions, devoid alike of interest and of life. Is it so? I am not expressing approval of all contemporary works; but I have no hesitation in asserting that, whatever may be said by adverse critics, our architecture exhibits characteristics the reverse of these. In point of material, the contrast with the past is striking, whether we like or dislike the free use of terra-cotta, marble, or faience, that is so much in vogue; while in respect to design, I challenge any impartial observer to find precedents for many modern buildings, which seem to sparkle with the impress of novelty. To quote illustrations from the works of living architects would be invidious, but many examples will occur to you which exhibit remarkable ability and originality on the part of their authors. I conclude, therefore, that the allegations to which I have referred—although occasionally emanating from those whose position entitles their opinions to respect—are groundless, and are refuted by the attainments of contemporary architects, whose works, whether we admire them or not, are the expression, not of a dead art, but of life and power.

Architectural Provinces or Districts.

In my last inaugural address I incidentally referred to a scheme which was then under consideration for dividing the United Kingdom into architectural provinces, each having its local centre, with the view of combining in one system the various scattered architectural agencies throughout the country and uniting them directly with the heart of the system, the chartered body in London. The subject has since been fully discussed and considered at a conference which was convened at Liverpool last April by the Liverpool Architectural Society, and which was attended by delegates from most of the allied societies, as well as by representatives of the Royal Institute appointed by the Council in compliance with the request of the Liverpool Society. A full report of the discussion has been furnished in our *Journal*, but I may quote two resolutions, which were unanimously adopted, as embodying the result of the Conference. The first is:—"That this Conference of delegates from the provincial architectural societies in alliance with the Royal Institute of British Architects has heard with great satisfaction the proposal to divide the United Kingdom into architectural provinces, which, if successfully carried out, will materially advance the interests of the profession throughout the country." The second resolution is:—"That by the establishment of such architectural provinces the Architectural Society of each district will have its local centre, and in time, by absorbing within its centre all architects of repute, bring into harmonious and united action the scattered and unorganised members of the profession; strengthen the position of all local practitioners, both professionally and socially; and enable arrangements to be made for extending throughout the country the advantages of the Progressive Examinations now established by the Royal Institute of British Architects; and, by promoting a systematic organisation for educational purposes, utilising and developing such means of instruction as may be available at and in connexion with such centres, raise the standard of architectural education in all parts."

The labours of the Committee to whom the subject was referred by the Council resulted in the development of a scheme which, having been approved by the Council, has been submitted to, and accepted generally by each of our allied societies. I have now the pleasure of giving a brief description of the scheme. Beginning with England and Wales:—

The Northern Architectural Association has Newcastle for its centre, and Northumberland and Durham for its province.

The Leeds and Yorkshire Architectural Society has Leeds for its centre, and the greater part of Yorkshire for its province.

The York Architectural Society has York for its centre, and the greater part of the North Riding and the parliamentary division of York for its province.

The Sheffield Society of Architects and Surveyors has Sheffield for its centre, and Derbyshire, northern Lincolnshire, and a part of South Yorkshire for its province.

The Manchester Society of Architects has Manchester for its centre, and Cumberland, Westmoreland, and parts of Lancashire and Cheshire for its province.

The Liverpool Architectural Society has Liverpool for its centre, and parts of Lancashire and Cheshire, with the counties of Flint, Denbigh, Carnarvon, Anglesea, Merioneth, and Montgomery, and the Isle of Man, for its province.

The Nottingham Architectural Society has Nottingham for its centre, and Nottinghamshire and part of Lincolnshire, including Lincoln, for its province.

The Birmingham Architectural Association has Birmingham for its centre, and Warwickshire, Staffordshire, Shropshire, Herefordshire, and Worcestershire for its province.

The Leicester and Leicestershire Society of Architects has Leicester for its centre, and Leicestershire and Rutlandshire for its province.

The Bristol Society of Architects has Bristol for its centre, and Gloucestershire, Wiltshire, Somerset, and Dorset for its province.

The Cardiff, South Wales, and Monmouthshire Architects' Society has Cardiff for its centre, and Glamorgan, Brecknock, Radnor, Cardigan, Pembroke, Carmarthen, and Monmouth for its province.

The Devon and Exeter Architectural Society has Exeter for its centre, and Devonshire and Cornwall for its province.

The Society which it is proposed should be established in the Eastern Counties would have Cambridge for its centre, and Cambridgeshire, Huntingdonshire, Norfolk, and Suffolk for its province.

The Home District of the Royal Institute of British Architects comprises, with London for its centre, Middlesex, Essex, Hertfordshire, Bedfordshire, Northamptonshire, Oxfordshire, Buckinghamshire, Berkshire, Surrey, Hampshire, Sussex, and Kent; and, until the formation of the suggested Cambridge Society, the counties of Cambridge, Huntingdon, Norfolk, and Suffolk.

In Scotland the Glasgow Institute of Architects has Glasgow for its centre, and the Lowlands south of the Forth, with Argyshire for its province.

The Dundee Institute of Architecture, Science, and Art has Dundee for its centre, and the Highlands north of the Forth for its province.

In the event of centres being established at Edinburgh and Aberdeen, these Southern and Northern provinces would be subdivided.

In Ireland the Royal Institute of the Architects of Ireland has Dublin for its centre, and, until the development of local societies, the whole of Ireland for its province.

In the matter of educational facilities, as regards the home division, thoroughness of teaching and training is secured to the student at the Architectural Association, whose curriculum was described in the pages of our *Journal* last year by Mr. Farrow. This curriculum, which has now entered upon its third year, has proved to be a great success, and a course of education is afforded therein which is eminently suited to the needs of the majority of students. Mention should also be made of the curriculum at King's College, a full description of which was recently given in the *Journal*; and of the most complete and interesting series of lectures now being delivered twice a week at University College.

In the majority of the architectural provinces educational facilities exist which are being taken advantage of by our allied societies, and which you will find described in detail in the "*Kalendar*" for 1893-94, just issued.

In Manchester great strides have been made during the past year, courses of instruction in architecture and kindred subjects, specially designed to meet the requirements of the progressive examinations of the Institute, having been arranged by the Manchester Society of Architects in co-operation with the technical school of that city. Classes for the students, elementary and advanced, have also been established by the Society, and valuable prizes are awarded; and at the Manchester School of Art facilities are now provided for the training of the student of architecture.

At Glasgow great success has attended the architectural courses at the Technical College, and classes in the various subjects connected with the art have been added during the past year. A curriculum having specially in view the several examinations of the Institute has been started at the Glasgow School of Art; and a prominent place is now accorded to architecture at the University of Glasgow, where classes of great practical utility to the student have been established.

In the district of which the Northern Architectural Association is the centre, a most comprehensive curriculum, extending over a period of five years, has been drafted by the Association, and is now in operation at the Durham College of Science, preparation for the Institute examinations again being the object in view. The Association itself provides courses of lectures during the winter months, and architecture in its elementary stages is a subject of importance at primary schools in the district.

Full particulars of the very complete course in architecture now in operation at Birmingham were published in the *R.I.B.A. Journal* last November; and the classes in Construction and Design held during six months of the year at the offices of prominent members of the profession in Birmingham have been well attended and fruitful of result, proving of the utmost value to architects' assistants and others.

In Sheffield, in Nottingham, in Leicester, new classes have been formed for the winter session. At Liverpool, by means of a grant from the City Council; at Leeds, with similar aid from the West Riding County Council—examples to be commended as worthy of imitation by similarly constituted bodies in other parts of the kingdom—lectures on subjects of value to the embryo architect are regularly delivered.

The three-years' course in architecture at the Dundee and District Association appears to be very complete and full of promise. The same may be said of the lectures delivered at the Technical Institute, Dundee, which prepare students for the Institute examinations; and of the classes in the Science School, which are specially arranged for the same purpose.

You will all, no doubt, concur with me in thinking that the importance of this scheme of architectural provinces, which owes its origin and existence to the active mind and organising power of Mr. Arthur Cates, is great. It may obviously be the means of developing and maturing throughout the length and breadth of the land an educational system which, under wise guidance, may be productive of most beneficial results to the architects of the future. Moreover, the creation of properly-defined districts, each with its local centre in direct communication with the metropolis, should certainly tend to promote the consolidation of the profession by encouraging freedom of intercourse between its members, and interchange of opinion on subjects of professional interest. I therefore hail the establishment of the scheme as an attainment of no little consequence in the interests of the profession.

Representation of Allied Societies on the Council.

The Conference of Allied Societies at Liverpool, to which I have already referred, unanimously adopted the following resolution:—"That, so far as the constitution of the Royal Institute of British Architects and of each society may permit, it is desirable that the President for the time being of each provincial centre shall have a seat on the Council of the Institute; and that this Conference do represent to the Council the desirability of steps being taken to obtain such modification of By-law No. 25 as will enable this to be done." The practical sympathy of the Council with this resolution was evinced when, at a general meeting of the Institute held on June 5 last, it was moved from the chair that such alterations should be made in By-law 25 as would permit of the proposal being carried into effect. It must be admitted, however, that, in their desire to carry out a suggestion which invoked their sympathy, the Council overlooked a difficulty presented by certain words in the Charter—and I desire to express regret for an oversight for which I am to some extent responsible. The Charter declares that the members of the Council are "to be elected at a general meeting of the Royal Institute"; and on Mr. E. T. Hall pointing out that if the Charter stipulates that the members of the Council must be elected it would be impossible to allot seats to *ex-officio* members, or to members created otherwise than by election, I admitted the force of the constitutional difficulty, and the matter was thereupon referred back to the Council for reconsideration. I embrace this opportunity to intimate that the Council, having reconsidered the question, are of opinion that the objection raised by Mr. Hall is a valid one; and that, having regard to the terms of the Charter, it is impracticable to adopt the proposal submitted by the Liverpool Conference. Actuated, however, by the strong desire to meet the views of the allied societies, a scheme has been formulated which will, in the judgment of the Council, effect the object in view, in so far as is possible, without

where only an occasional visitor would see them, it might be desirable that they should, if possible, be deposited where they would be accessible to students of Art. The suggestion appeared so admirable that I did not hesitate during the recess to designate a small committee of experts, consisting of Mr. Wyatt Papworth, Mr. J. D. Grace, and Mr. Eustace Balfour, and to authorise them to consider the suggestion, and report to the Council whether it might not be possible to take action respecting it. As the result of this I addressed a letter to the Duke of Devonshire, in which I pointed out that the collection was of great architectural value, as well as interesting from an archaeological point of view; that if some scheme could be formulated by means of which it would be permanently accessible for purposes of study and reference, great benefit would be conferred on students of architecture: that with this view I had requested a small committee to consider whether such a proposal could be devised as might be reasonably submitted to his Grace for consideration; and that this committee had recommended the Council to ask his Grace to present to the Institute such of the drawings, &c., in the collection as were of interest or importance to architects, subject to the conditions: (1) That the said drawings so presented be always kept together and identified as the Burlington-Devonshire Collection; (2) that they be specially insured against fire; (3) that they be never sold or otherwise disposed of without the consent of the Duke, his heirs, or successors; (4) that, in the event of the dissolution of the Institute, the said drawings be returned to the Duke, his heirs, or successors; and that these conditions, and any others that may be desired by the Duke or his advisers, be embodied in a deed of trust—as in the case of property raised or bequeathed for the purposes of Studentships, &c., in the gift of the Institute—with a schedule attached containing a list of the drawings so presented and entrusted to the Institute. I further pointed out that the collection comprised, among many other drawings of less architectural or archaeological interest than those in the selected list, a large number of designs made in the last century (some of which have been published with the inscription, "Burlington Architectus"), and Vitruvius printed at Venice in 1567, which contains MS. notes by Inigo Jones, as vouched for by the great Earl of Burlington himself; and that, although neither the book nor the designs were included in this application, they were works such as a central representative body like the Royal Institute of British Architects would be proud to preserve in its library among its most important treasures.

In writing this letter I adopted what may be thought—and no doubt was—a somewhat exceptional course; but I did so under the conviction that I might rely on the large-minded and liberal view which the Duke was sure to take of such a proposition; and the result shows that I was not far wrong.

Although I have not yet received an official reply from his Grace, I am permitted by his agent to say that the Duke has acceded generally to the request embodied in my letter; and that, subject to a final revision of the books and drawings, the matter may be considered settled. When it is completed, you will, I am sure, desire to convey to the Duke of Devonshire your cordial acknowledgment of his chivalrous action, as well as to the members of the committee for their valued services. It is certainly most gratifying that a collection of such exceptional interest is to be confided to the care of the Royal Institute of British Architects, for the benefit of students of architecture, and I doubt not that you will concur with me in regarding the acquisition as an attainment of vast importance.

Contemporary Architecture.

In a previous portion of this address I defended—I hope, in your judgment, successfully—the works of contemporary architects from the reproach of want of originality. It does not, however, follow that the perception of the beautiful displayed in such works is commensurate with the originality of their design. I have, indeed, on a previous occasion recorded my conviction that the craze for novelty in the present day—not alone in art—is excessive, and not infrequently results in the grotesque. Is novelty the goal of our attainment? Is it not rather Beauty? When the Greeks produced what is the purest form of art, so far as we know, that the world has seen, it was not the outcome of a rage for novelty, but of the effort to crystallise

in a beautiful form the requirements and conditions of life. It was in the days of their decadence that an intelligent observer recorded of them that "they spent their time in nothing else but either to tell or to hear some new thing." Can it be that such decadence is overtaking us? Judging by some modern works, their authors might not inappropriately be referred to in terms similar to those applied to the late Athenians; for their desire appears to have been, not so much to produce what is beautiful, as to evolve "some new thing." A column was originally designed to support the superincumbent weight known as the entablature, and in such juxtaposition is dignified and consistent; but divorced from such relationship, and applied to the face of a building with nothing to support, it is degraded to the position of an incongruous feature of ornamentation. An Order, again, is composed of certain parts, which, in the relationship they were designed to occupy, produce admittedly proportions that are dignified and beautiful; but when applied—one can scarcely say designed—in a ridiculously attenuated form, with parts misplaced or omitted, the result is grotesque. The conglomeration of familiar forms and features, divorced from the conditions they were designed to fulfil, and thrown together regardless, apparently, of any consideration but the attainment of novelty, produces the incongruous and silly effect that might have been foreseen. Yet by critics who ought to know better this sort of architectural quackery is lauded as original design, and its authors are praised as men of exceptional ability. Whatever it may be, it is certainly not original work in the true sense of the words, but the parody that passes muster for it with the ignorant. The impress of original power is stamped on features not necessarily new, and imparts to them distinctive life and character, instead of rendering them ridiculous by divorcing them from their proper purpose. Contrast with such grotesque productions the works of the late Sir Charles Barry, and tell me in which you find the truer originality or the purer taste. In Barry's classical work there are dignity, repose, proportion, ample undisturbed wall-space, every feature and moulding adapted to its position, and in all the stamp of individuality without any appearance of straining after novelty. In the hotch-potch work I refer to, there is neither dignity nor repose; features and mouldings are indiscriminately applied, instead of being designed as inherent elements in the composition; and the deplorable absence of purity is in no way compensated by fulsome profusion of ornamentation. This practice of covering every bit of wall-space with ornamentation, composed of details pretty and original in design, but applicable, from their petty scale, to cabinet-work and not to buildings, is the curse of our modern street architecture, and demonstrates an absence of grasp and appreciation of breadth which it is sometimes painful to observe. In walks about London one longs to apply the scalping-knife in stripping off meretricious ornament, in order that the eye may find repose on some bit of undisturbed and undisfigured wall-space.

It is not often I have found myself in sympathy with the utterances of the venerable statesman who now occupies the position of Prime Minister, and it is consequently agreeable to be able to concur in views which he expressed a few months since when speaking of Industry and Art. "There is a circumstance in architecture," Mr. Gladstone said, "which terrifies me, and that is the tendency which appears to prevail in modern domestic architecture. I am speaking of their exteriors, and I refer to their redundant ornamentation. There are a great number of new buildings in London with regard to which, if you look at them, you will find that the architect had either a horror or a dread of leaving bare a single square foot of wall, as if there were something indecent in leaving bare a square foot of wall. . . . Excess of ornamentation is, of all things, the most hostile to a due appreciation of proportion, because it is in proportion to the perception of breadth and beauty and line, and in the adjustment of lines to one another that the essence of the art lies, and in that you will find the hope of attaining high excellence in great works." Not in great works only, I would add, but in all works, great or small.

But while I deplore this meretricious tendency for redundant ornamentation, and while I decry the craze for novelty, which together are responsible for disfiguring many of our modern domestic buildings, I yet desire to record my conviction that there is much that is hopeful and promising in contemporary architecture. Even

the rage for educating some new things, exaggerated as it is, demonstrates that men prefer to think for themselves rather than to reproduce the works of others. If only the remarkable ability which is displayed in the designs of many recent buildings were directed less to the production of novelty and more to the study of proportion, less to the elaboration of ornament and more to the aspiration for simplicity; if only architects were to lead the taste of the day by impregnating their designs with "the perception of breadth and beauty and line," instead of pandering to the false and meretricious taste of a luxurious age; we should be able to congratulate ourselves—and perhaps at no distant date—on having reached the attainment of an architecture, pure, simple, dignified, and beautiful.

The President said they had with them that evening Mr. Campbell, M.P. for the Universities of Glasgow and Aberdeen, who had been good enough to look after the interests of the profession on various occasions in the House of Commons. He was glad to have the opportunity of publicly acknowledging the services rendered them by Mr. Campbell, and of welcoming him to the meeting.

Mr. Campbell, M.P., said he had been asked to propose a vote of thanks to the President for the address he had just delivered, which was eloquent, instructive, comprehensive, and suggestive. The President had alluded to the complaint that no style of architecture had been produced in this age; but he believed the critics who made that complaint took their ideas rather from fashion, which had reference to things intended to change, and falsely applied them to works intended to last for generations. It could not be expected that the fashions of architecture should change as did those of hats and bonnets. Architecture had reference to something stable and permanent, except, of course, at the World's Fair, Chicago, where, he understood, the buildings were constructed of materials warranted to last for not more than six months. Although changes in architecture were not expected to be frequent and rapid, yet they could not but recognise, as the President had reminded them, that changes did occur, depending, for example, upon the introduction of new materials. It was impossible that the use of such things as the steel girder should not be followed by corresponding changes. Architects availed themselves of the opportunity of having greater spans for floors and ceilings, and so the introduction of new materials had led to considerable changes in architecture. Another cause of change was the altered condition of social life. People nowadays did not live in the same way as did their ancestors, but had higher ideas of personal and domestic comfort in ordinary life. No one could doubt that who compared a good old London house with a new one, and especially in regard to the basement. In the old days the comfort of the domestics seemed never to have been considered. At the present time, however, domestic architecture was not merely for grand routs and assemblies, but for the daily comfort of the family, and this must necessitate a considerable difference in the architecture of these days.

Reference had been specially made to external architecture, and no doubt there were now plenty of flamboyant novelties. He was not disposed, however, to lay the blame upon the architect; on the contrary, he believed the blame would be found to rest with the client. The architect did his best to design a particular work, but he was afraid that in these days of advertisement a commission was often given with the desire that the elevation should be as conspicuous as possible, and the last thing the client expected would be an elevation of a quiet, unobtrusive, and beautiful character. With respect to the education of the young architect, it was, no doubt, of the highest importance that the history of architecture should be studied by every young man who intended to adopt the profession. Were they to throw aside all the experience of the past, and to encourage young men to work up as architects without their knowing what had been done in the profession? The President had well shown that the thorough education of the architect was by no means a ban to originality of design.

Mr. Lloyd Taylor, of Victoria, in seconding the vote of thanks, said that he rose with some diffidence to second the vote of thanks to the President. The deep interest he had taken in the Institute by the regular reading of its Transactions had kept him quite *au courant* with what had been done by that body. As a Past President of the Royal Victorian Institute of Architects, a small and indeed insignificant body as compared with this great Institute, he was not unaware of the grave difficulties and responsibilities attaching to the

office occupied by Mr. Macvicar Anderson, whom he wished to compliment upon his comprehensive and interesting address. In former addresses the key-note had been progress, and it followed that that should be succeeded by the consideration of attainment. At the same time it would be universally agreed that it would be a sad thing should the day ever arrive when any person or any institute realised that completeness had been attained. This would in reality be even retrogression; and progress, which in the past had been their watchword, must ever remain so. Attention had been called in the address to the taunt so constantly brought against them, that they had invented no new thing in the shape of a style, but were always wandering in the same old beaten track. The President had remarked, with truth, that architecture was the result of the actual outcome of the conditions of life. These conditions, it would be admitted, were subject to very gradual and almost imperceptible change, and he contended that in that deliberate manner alone could any new style be devised or invented. The next subject alluded to was the system of education and the programmes of examinations, with the objections made to these. He could not possibly understand these objections. Surely all recognised the genius of those who had gone before, and who had left behind them great works for their admiration and delight. Surely these should be profoundly studied, and it should be incumbent upon them to test by examination whether the intending architect had done so, and that he had not, at the same time, neglected that intellectual culture without which they might in vain look for the refinement that should characterise the work of every architect. Next came the question of originality, and upon this point they would have the least possible concern. Originality was a gift which would at all times assert itself, and overlap every bound. Originality, no doubt, was rare, for, were it not so, it would be known by some other name. Did education and the test of examination trammel originality? Had the exact and precise lines of harmony trammelled the great composers, Mozart, Beethoven, and Mendelssohn? Of the architect, as of the poet, it would be said, *navitur non fit*, so far as genius was concerned; and while solid and substantial intellectual pulchritudo must be applied and assimilated by those who were among the rank and file of the profession, could it possibly do harm to anyone who by his genius would rise head and shoulders above them? Culture and refinement were, and ever would be, the results of progress and attainment. On the subject of the builder-architect, he regretted to say that his experience tallied with what the President had said. It was an evil which, as long as human nature remained as it was, he feared must be put up with. On the question of the legal registration of architects, he considered the Institute had done wisely in opposing the Bill, and he congratulated the Institute on its successful opposition. But in the case of a new country, such as that from which he came, if that were the time and place, he could give some explanation of the different conditions under which such a Bill would be approved. The Institute of which he had had the honour of being President did, some time back, promote a Bill for the legal registration of architects, the clauses of which, if adopted by the Legislature, would have involved very heavy sacrifices on the part of every practising architect in the community; although well aware that they would be sufferers for a time, they were yet prepared, from high motives, to accept the position, in the hope of preventing unworthy persons in the future from practising as architects. Before the Bill, however, had reached the Legislature, it became so emasculated, in order to avoid opposition, that he, like many others, rejoiced it had never become law. On the matter of architects' charges, he might say that in their new country they had other standpoints and grounds which compelled them in some measure to differ from architects here; but their views on this point were even more conservative than those of the old country. Finally, the President's remarks on the craze for novelty, the often resultant grotesqueness, and the redundancy of ornament, were subjects deserving the serious thought and study of every member of the profession. That was especially the case with those who practised architecture in young and rising communities.

Mr. S. Vacher having made a few remarks, which were inaudible at the reporters' table, the resolution was put, and carried by acclamation.

The President, in replying, thanked the meeting for the kind manner in which his remarks had been received. He added that the next meeting

of the Institute would take place on Monday, the 20th inst., when a paper would be read by Mr. Edward Falkener, on "The Grecian House, as described by Vitruvius."

The proceedings then terminated.

Illustrations.

THE PERSIAN AND DELPHIC SIBYLS.

THESE figures, the work of Mr. W. B. Richmond, form part of a design for the splay on either side of the clearstory windows under the lunettes in St. Paul's Cathedral. They are faced by Solomon and David, and are led up to by the Prophets on the one side and the Temple builders on the other. They are nearest to the Recording Angels and the Majesty, which are already finished in the apse.

In designing them the artist has accepted the fifteenth-century view of the importance of the Sibylline leaves, besides using them as examples of Holy Women. In this sense they serve as the link between Pagan and Christian times.

The figures are being executed in mosaic; the illustrations are from the large cartoons now hanging in the Central Hall at the Arts and Crafts Exhibition, but the colours will be much stronger than appears from the cartoons, which have been a good deal rubbed and knocked about during their use by the mosaic workers.

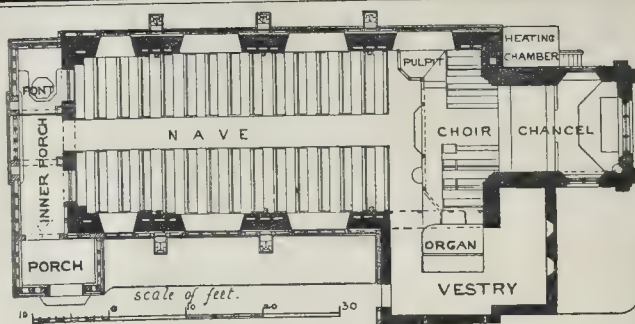
ST. JOHN'S, HIGH LEIGH, CHESHIRE.

THE oldest document known which throws any light on the ecclesiastical history of High Leigh, is a small piece of parchment about the size of a half-sheet of note paper, now in the possession of the Rev. H. A. D. Surridge, the incumbent. This valuable relic states (in Latin) that at Wilsnlow, on September 20, 1447 A.D., a licence was granted by the then Bishop of Lichfield and Coventry, to build a chapel-of-ease at High Leigh, and there is a tradition of a black and white structure having existed on the site of the present chapel, although it had long been disused. When the immediate predecessor of the present building was burnt down in April, 1891, it was considered advisable to adopt the revival of the original black and white style, some few examples of which may be found in some old churches still standing in this part of Cheshire.

Accordingly, as after the fire the stone walls, although disfigured, were found sufficiently strong, they served as a core around which to build the solid half-timber framing which formed an excellent protection to the exterior stonework in the restoration of the building. The entrance porch is so arranged as to avoid the draughts caused by the strong westerly winds which prevail in this district. Over the centre of the porch is the ringers' chamber in the lower part of the bell turret.

Considerable additions have been made to the chapel, the chancel being almost entirely new. The pulpit is the gift of Colonel Cornwall Legh, the font is also a gift, and the erection of an organ by one of the best builders is in contemplation. The whole of the cost has been defrayed by Mr. Egerton Leigh, of West Hall. The architect is Mr. Edmund Kirby, of Liverpool. The builder is Mr. T. Leicester, of Northwich.

The drawing was exhibited at the Royal Academy this year.



St. John's Church, High Leigh, Cheshire.—Plan.

HURSTBOURNE PARK.

WE this week give an illustration of the mansion now in course of erection at Hurstbourne, near Whitechurch, Hants, for the Earl of Portsmouth.

The previous mansion was so completely gutted by fire in 1890 that it was thought better to entirely rebuild, and the cellars are all that have been utilised in the new building.

The main entrance on the north side is under a *porte cochère*, and leads into the great hall (see plan, p. 359), which is open to the full height of the ground and first floors, the grand staircase being in the north-west angle of the same.

A gallery 16 ft. wide runs from end to end of the main building, from which the various reception-rooms are entered, and there is a similar gallery on the first floor, with bed-rooms for guests on either side. Above this are the bachelors' rooms, approached by a separate staircase, and at the western end the rooms for the maid servants.

The Earl's private suite occupies the south-west wing, which is entered on each floor from the galleries, and also has a separate staircase.

The kitchen wing, which in the former mansion faced the south, is now on the north side of the courtyard.

The elevations, of dark red bricks from the neighbourhood of Southampton, have stone dressings from the quarries of Messrs. Trask & Sons, of Douling, who also have done the working and fixing.

The roofs are covered with red tiles, the gutters, flats, cupolas, finials, &c., being of copper. The whole of the floors are of fireproof construction, and it is intended that the greater part of the internal joinery should be of oak.

There is no contractor for the whole of the work, Lord Portsmouth employing his own labour, and entering into contracts only for special works.

The designs are by Messrs. Beeston & Burmester, of London, who are also superintending the carrying out of the works.

The drawing of the house was exhibited at the Royal Academy of this year.

OXFORD MUNICIPAL BUILDINGS.

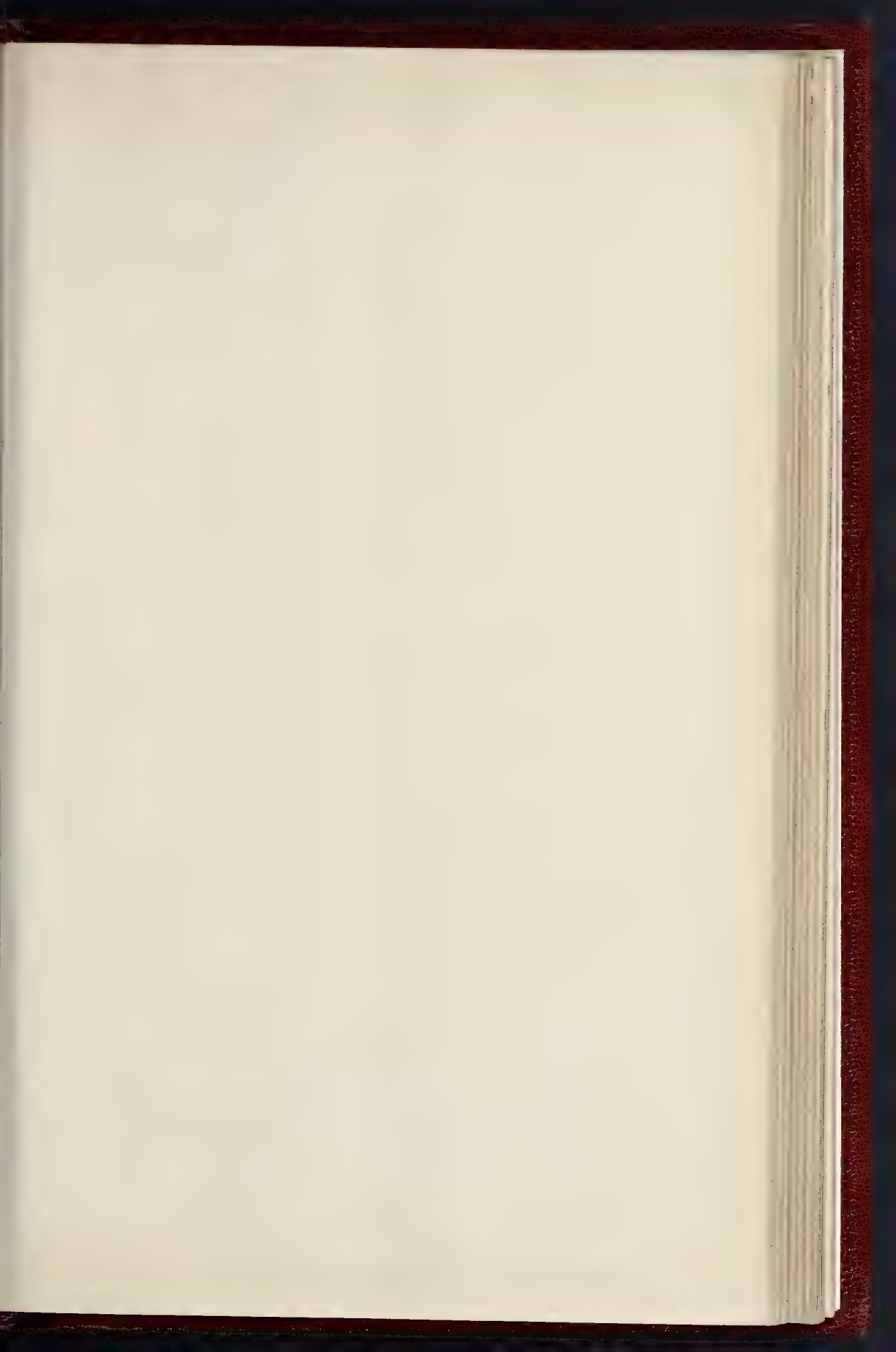
THIS sketch design, though not premiated, was one of those selected by the assessor, Mr. Colcutt, for special mention in his report, out of the unusually large number of designs (one hundred and thirty-five) submitted in the first competition. The drawings were returned to the author with the official intimation that the design was "commended."

The Town Hall, Assembly Room, and Mayor's parlour, and both Committee rooms are placed on the first floor, all communicating so as to form one grand suite of rooms. The municipal officers' rooms are all on the ground floor. The Free Library is also all on the ground floor, being so arranged to avoid the loss of space in a staircase involved by placing the accommodation on two floors. The Police Department is in the rear of the Municipal Offices, and the department for Administration of Justice is in the south of that, both with entrances from Blue Boar-street.

Heating and ventilating arrangements provide for steam radiators and fresh air inlets in the window recesses, and for the extraction of vitiated air at the ceiling level.

Externally the buildings were to be faced with stone and the roofs covered with thin stone slabs. The drawing was exhibited at this year's Royal Academy.

T. FREDK. PENNINGTON.



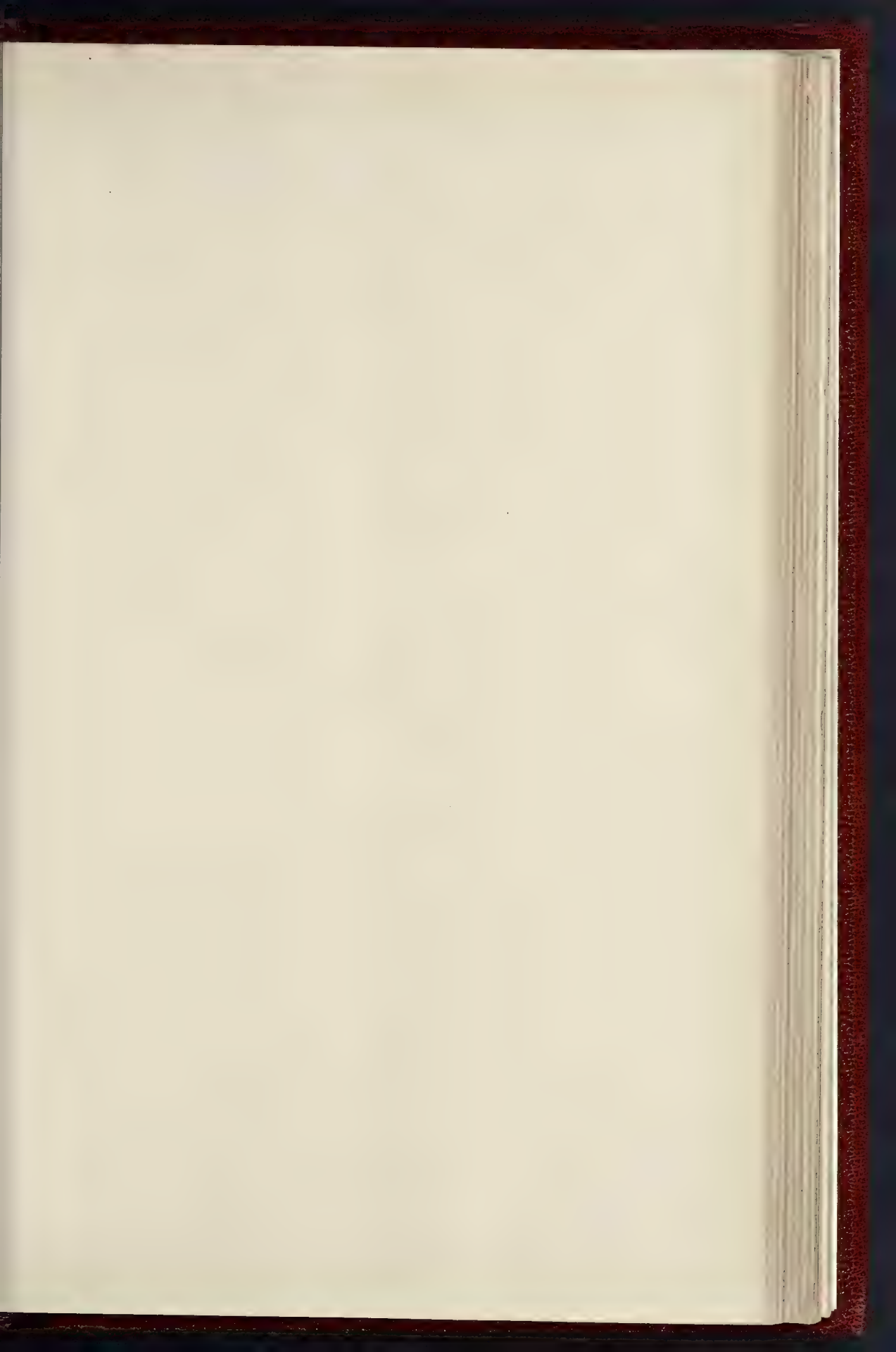


ST JOHN'S CHURCH HIGH LEIGH

Royal Academy Exhibition, 1893



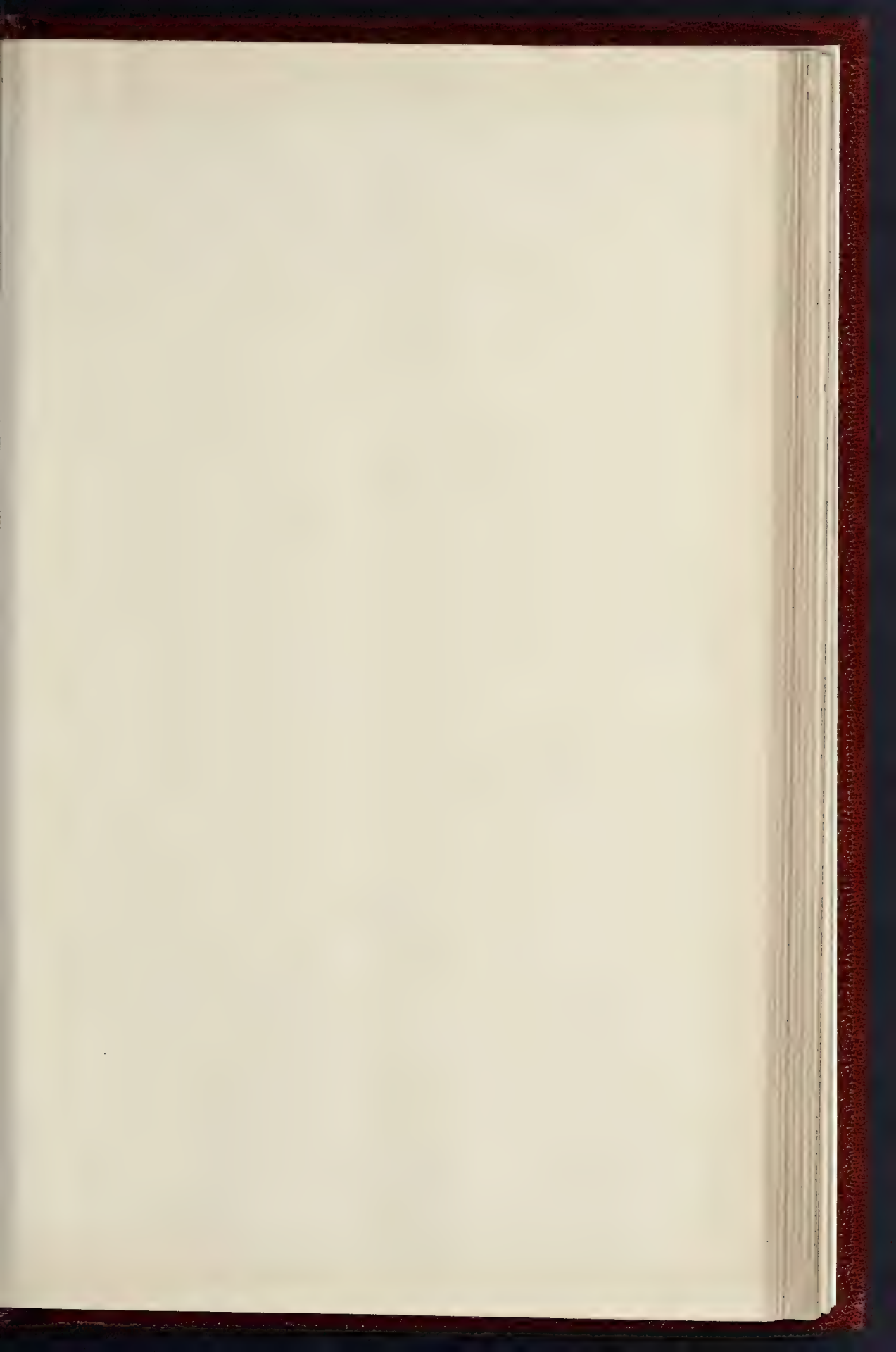
MR. EDMUND KIRBY, F.R.I.B.A., ARCHITECT.



THE BUILDER, NOVEMBER 11, 1893.

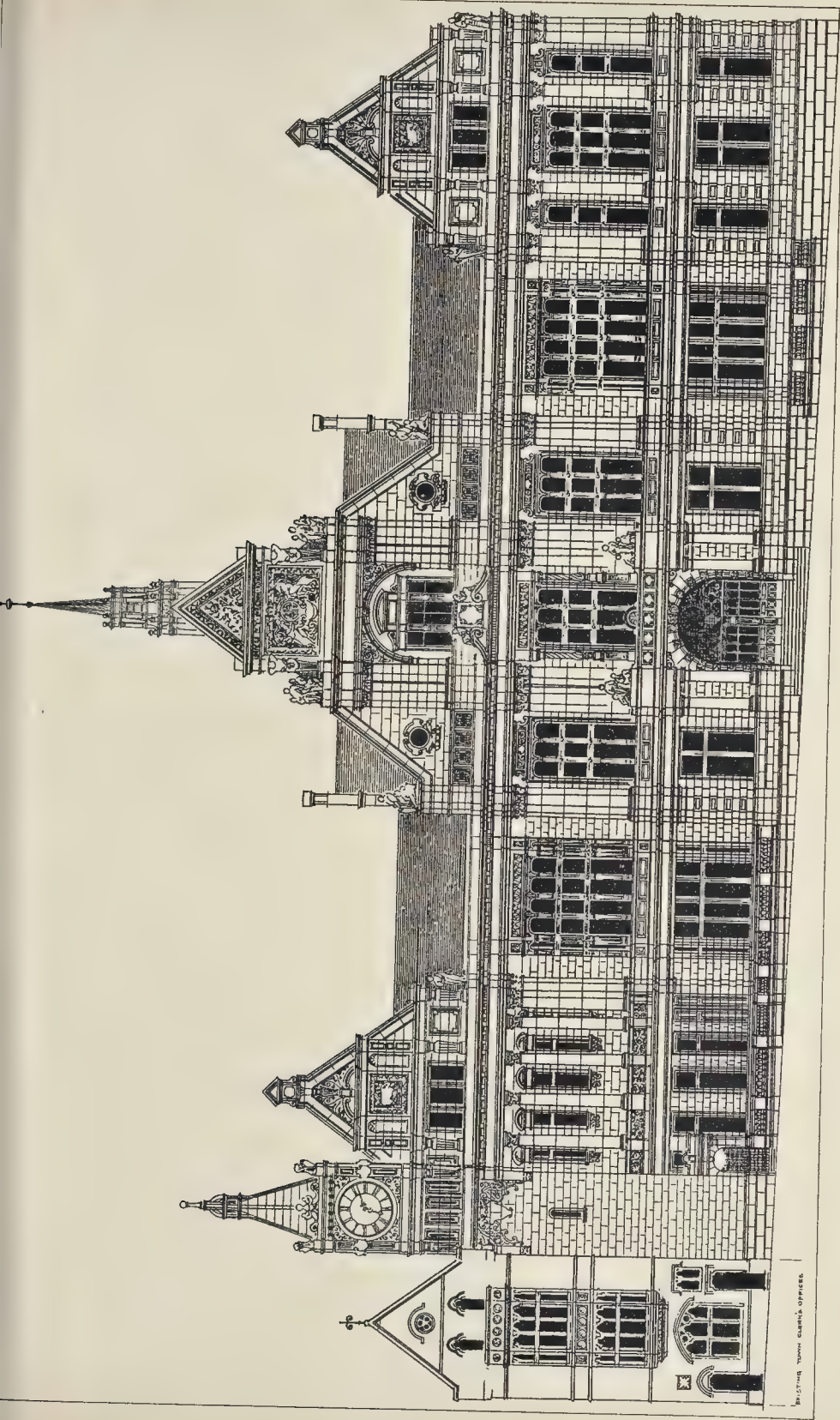


W. H. J. BERRY, del.
1893.



THE BUILDER, NOVEMBER 11, 1893.





Building from artist's office

PHOTO-LITHO BY ALFRED & CO. 45 EAST HADFIELD STREET, LONDON, E.C.

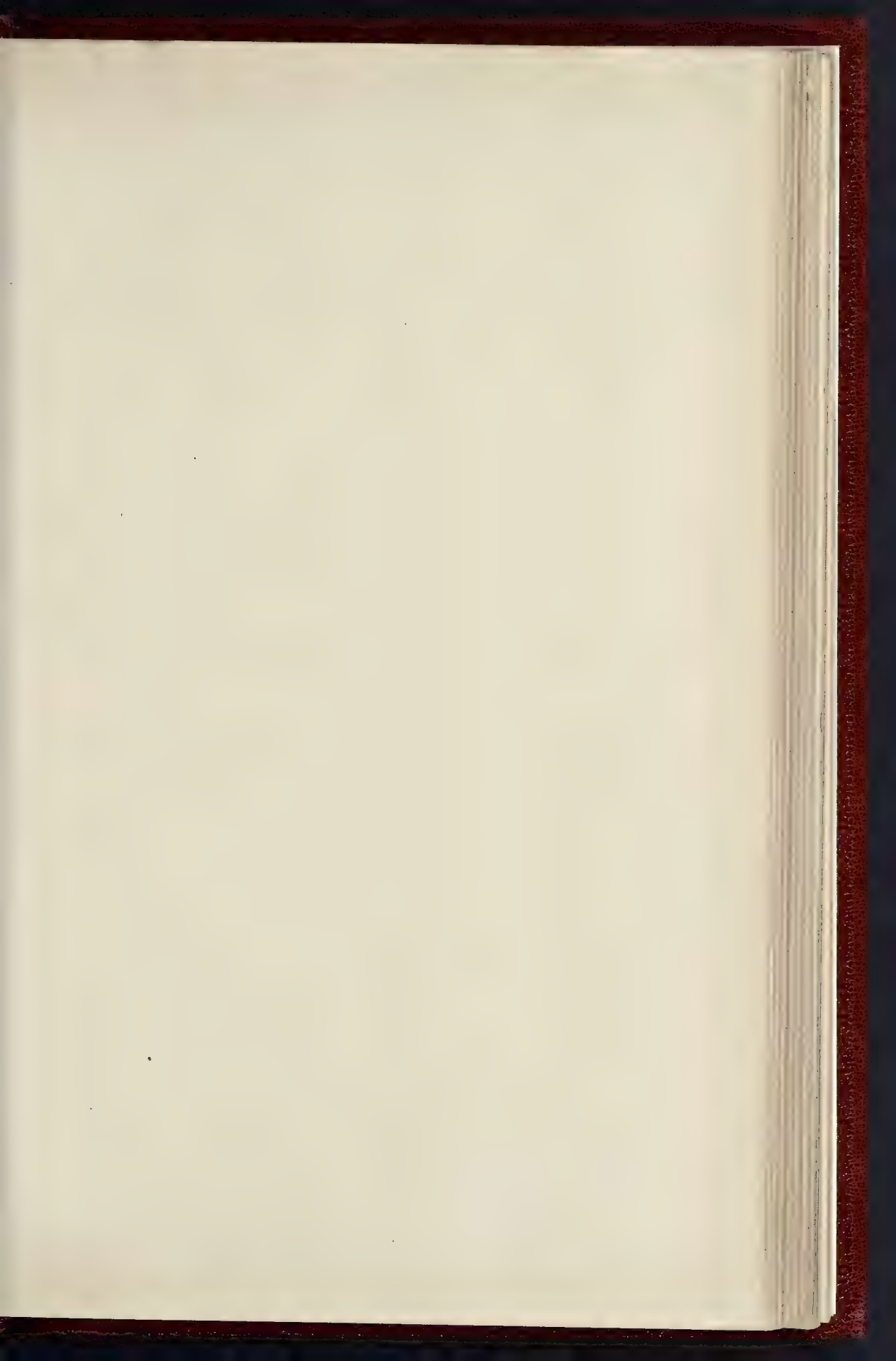
COMPETITION DESIGN FOR OXFORD MUNICIPAL BUILDINGS.—MR. T. FREDERICK PENNINGTON, A.R.I.B.A., ARCHITECT.

Royal Academy Exhibition, 1893.



PHOTO. THE DURA. J. S. L. P. H. A. S. T. A. Y. H. A. R. D. N. O. S. T. R. E. E. T. P. L. E. T. T. E. R. N. A. M. E. I. C.

HOUSE AT BISHAM-ON-THAMES. MISSES. KOSNER N. BERRY, ARCHITECTS.







THE PERSIAN AND DELPHIC SHIRTS
 CARTOONS FOR THE Mosaic Decoration of St. Paul's Cathedral. By Mr. W. B. Richmond A.R.A.



Ground Floor Plan

Scale of Feet
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200

REFERENCES.

- | | | | |
|------------------------------|-------------------------|-------------------|---------------------|
| 1. Great Hall and Staircase. | 7. Morning Room. | 14. Serving Room. | 22. Cook. |
| 2. Dining Room. | 8. Private Dining Room. | 15. Butler. | 23. Kitchen Yard. |
| 3. Smoking Room. | 9. Strong Room. | 16. Pantry. | 24. Servants' Hall. |
| 4. Gallery. | 10. Study. | 17. Plate Room. | 25. Housekeeper. |
| 5. Drawing Room. | 11. Bouloir. | 18 & 19. Larders. | 26. Still Room. |
| 6. Library. | 12. Garden Room. | 20. Kitchen. | 27. Gun Room. |
| | 13. Valet. | 21. Scullery. | 28. Court Yard. |

"Hurstbourne," *Hants.*

HOUSE AT SURBINTON.

The drawing shows the entrance front of this house. The walls are faced with red brick, high-cast, and weather-tiling, and the roofs covered with plain red tiles. Messrs. Kidner & Berry are the architects, and K. W. Watson, of Ascot, is the builder. The drawing was exhibited at the Royal Academy this year.

HOUSE AT BISHAM-ON-THAMES.

The drawing shows the river-fronts of this house. The plinth is formed of red bricks; the walls of ground floor above the plinth are faced with rough-cast, and those above weather-tiling, also, are rough-cast. A dado is made of dark-coloured glazed bricks in the walls under the verandah. The roofs are covered with iron tiles. The windows on the ground floor are stone mullions, transoms, and dressings, and are fitted with iron casements and frames. Messrs. Kidner & Berry are the architects, and K. S. J. Scott, of Blomfield-street, London, is the builder. The drawing was exhibited in the Royal Academy this year.

MAGAZINES AND REVIEWS.*

The most interesting article in the *Art Journal* is Mr. S. E. Waller's, on "The Evolution of a Picture," the picture known as "The Day of reckoning," describing the manner in which each element in the picture was studied and prepared; the figures, the horses, and the architectural background, which is founded on Kirby Hall. In regard to the latter, the author remarks that all architecture used as background to figures needs careful management, as if made much of one such a huge canvas, and the figures come very small, and are consequently sacrificed. "The safe plan I have generally adopted is to get a full portion of the building in front to full scale with the figures, and give size and extent to the remainder by letting it run off in acute perspective. This is well exemplified in the illustration, as to my mind I threw out the porch more than 20 ft." This point is illustrated by a sketch of Kirby Hall; it really is, and another of the building as manipulated by the artist for his picture. Other titles in the number are "On Historical Painting in France," by M. Frédéric Masson, on the Arts and Crafts Exhibition, with some old illustrations reproduced from photographs. Mr. Hodgson's and Mr. Eaton's article on the

The object of these notes is to point out anything in contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on views expressed in such articles. When a magazine has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

"Royal Academy in the Present Century" deals with Turner and Flaxman. The estimate of the genius of the latter, both in regard to his powers and his shortcomings, seems eminently just. We are glad to see among the illustrations a good engraving of the beautiful group of "Apollo and Marpesa," Flaxman's diploma work, and (unlike some diploma works) one of his very best productions.

The "Annual" of the *Art Journal* is this year a monograph on the life and works of Mr. Holman Hunt, an artist who has always seemed to us to have suffered from the fact that his artistic productions are overweighed with the attempt at conveying moral meaning. It is perhaps from a tacit conviction of this that Archdeacon Farrer, whose opinions on art cannot be regarded as of any special value, has been selected as the principal literary contributor, to preach a kind of sermon on Mr. Hunt's art, which in itself suffers from too much sermonising accompanied by too much straining after literalness of execution. His one absolutely perfect work seems to us to be the "Strayed Sheep," a little gem of almost priceless value. In his "Isabella," he misses the sentiment of Keats; the figure is fine, but it is not Keats's Isabella. The "Hiring Shepherd" includes one of the most wonderfully real bits of foreground and middle-distance landscape that was ever painted; but the picture is spoiled, pictorially, by the over-accentuation of the figures. "Valentine rescuing Sylvia" is one of the most perfect and best balanced of his works, and perhaps as an illustration of a scene in Shakespeare stands almost alone in its complete realisation of the action and the characters; the embarrassment of Julia in her boy's dress, as she foresees the *éclaircissement* impending, is expressed in the most masterly manner. The popular admiration of the "Light of the World" we find it utterly impossible to share; the picture is an anachronism; it is Medieval stiffness and Medieval allegory acted in modern life. "The Awakened Conscience," though it suffers from the artist's fatal tendency to over-accentuation in the character and expression of the figures, we have always considered one of his most successful works, but illustration of it is omitted here; it is to be presumed that it would not have suited the reverend author's clientele.

The *Magazine of Art* gives as a frontispiece a fine photograph by Dujardin of one of Rossetti's best works, the "Veronica Veronese." "Art in the Theatre," by Mr. Percy Anderson, deals ably with stage costume from the artistic point of view. The veteran sculptor, Mr. John Bell, contributes a very interesting illustrated article on an attempted restoration of the Venus of Melos, whom he regards as a "Venus Donatrix," a great goddess conferring honours, and represents her as conferring garlands, one upraised in the left hand, one held downwards in the right hand. No such restoration can be more than conjectural, but this is a fine conjecture, and suits well with the action

of the figure as left to us. Mr. Reginald Blomfield contributes an article on "A French View of Gothic Architecture," the text of which is M. Corroyer's book, which has been reviewed at some length in our columns, and which Mr. Blomfield summarises—quite justly to our thinking—as a book which, though very readable, can only be regarded as "an inadequate and hasty account of a very large subject—a subject, moreover, which is too familiar to students and travellers to admit of such a hasty treatment." The fact is that the French are so ignorant of all architecture but their own, that they cannot understand that other nations, the English especially, know French architecture very well, and are not likely to be put off with patriotic and one-sided criticism in regard to it.

The *Studio* devotes a long article, by Mr. Horace Townsend, to the Arts and Crafts Exhibition, with a great number of photographically reproduced illustrations, some adequate, some not quite so, but on the whole the fullest illustration of the exhibition which has appeared. The remainder of the number is mainly occupied with small items of art news and art criticism.

The *Fortnightly* includes an article on the "Lock-out in the Coal Trade," by Mr. Vaughan Nash, a well-meant and sympathetic plea on the workman's side, but one of the most unphilosophical essays on such a subject we ever read. The writer upholds the theory that "a living wage" must in future be accepted as the ruling element or condition in regard to the price of coal. How is he going to define "a living wage?" Cannot he see that in the end this means merely what the workman thinks he ought to have? It is too absurd that such nonsense as this should be written under the guise of so-called philanthropy. Mr. Cope Whitehouse's article on "How to Save Egypt" is an important though brief one, dealing with the question of forming a reservoir to impound the flood waters of the Nile, a measure which we should imagine to be perfectly practicable at a sufficiently large outlay; but there's the rub. "The Ice-age and its Work" forms Part I. of an important geological communication by Mr. A. R. Wallace.

The *Nineteenth Century* contains an article on "The Coal Crisis," by Mr. Jeans, of a very different stamp from the weak, sentimental philanthropy which several writers have given vent to on the subject. Mr. Jeans offers some considerations as to the possible causes of the special tendencies to strikes lately in connexion with coal. In regard to this special strike in particular, he suggests that the agitation and alarm over the week's strike last year has possessed the miner with the notion that the public can be manipulated, and he has been anxious to try the experiment on a larger scale, and has failed only because the scale is not large enough, and only the miners of one district have struck. As an ultimate result of these strikes Mr. Jeans points to a possible import of coal from America—a consideration which ought to be a grave one enough for both employers and men.

The *Pall Mall Magazine* contains some of the best book illustrations we have seen lately, in the cuts accompanying the story of "The Sere, the Yellow Leaf," especially the frontispiece by Mr. W. H. Margeson, a most graceful sketch of two girls seated at a window looking out into the night. The article by "Ouida" on "The Passing of Philomel," on the way birds like the nightingale are getting built out and driven away from the country, is too sadly true, though we do not know what can be done to prevent it.

The *Contemporary Review* includes an article on "The Miners' Battle—and After," by Mr. Sydney Olivier, the temper of which may be judged of from the phrase "the recent onslaught on wages" by the coal-owners. Mr. Olivier is one of the prophets of the "living wage" fad, who imagine that wages are to rule prices, and that an ideal proper wage can be fixed on some principle which they do not explain. The people who write this kind of Utopian nonsense are the worst friends of the miners. Mr. Theodore Bent contributes an article on "Mashonaland and its People," which, coming from a man who knows the country, will be of interest just now. A very interesting article is that by Mr. Jukes-Browne on the Geographical Evolution of the North Sea; an answer to the question "when did the area now covered by its waters first come to be relatively lower than the countries which surround it?"

The article is accompanied by some geological maps (or diagrams rather) in illustration of the argument.

The *New Review* contains five capital short articles on "The Advertisement Nuisance," by Mr. Lecky, Mr. Besant, Lady Jeune, Mr.

Richmond, and Mr. Julian Sturgis. Mr. Richmond remarks on the genuine love of scenery by which English people are characterised as compared with Continental nations, and hopes we are not going to prove to succeeding generations that we have become demoralised and unscientific in this respect. Mr. S. J. Viccars writes on "British Art in the National Gallery" to the effect that it is imperfectly and inadequately represented, and every one who knows anything of the matter will agree with him. Professor Ferrero contributes a short and original paper on "Woman's Sphere in Art," an endeavour to account for the unquestionable fact that women have never been great creators in the more important arts, and to specify the arts in which they really excel. Among these he places the art of conversation, and we are glad to see it recognised as an art, as it certainly is in a sense.

In *Macmillan's Magazine* Mr. Toyne's short article, "A Winter's Experiment," describes an effort which was made to organise work last year for some of the unemployed, and to endeavour to assist them in getting out of the ditch. The result is melancholy but instructive; those interested in the question of how to help the poor should read the article.

We are glad to observe that the publishers of *Punch* are reissuing a series of the *Punch* illustrations in monthly parts. Though great wits (not by any means "to madness near allied") have from time to time contributed to our comic periodical, the permanent interest of *Punch* remains mostly in the illustrations; the majority of articles have lost their point after a time. Some of the republished engravings take us pleasantly back to old times; but, on the whole, one impression left on the mind is that, however good the *Punch* illustrations used to be, they are, in the main, much better now. The loss of Keene leaves a dreadful gap, no doubt, but still the illustrations of to-day more than keep their place against those of a quarter of a century back. The collection will be a real boon to those who have not got, and cannot now get, the back numbers of *Punch*.

The *Century* gives an interesting article by Mrs. Van Rensselaer on "Fifth Avenue," with some excellent sketches by Mr. Childé Hassam, and Miss Virginia Vaughan contributes an article, partly biographical partly critical, on George Michel, "the painter of Montmartre," as she defines him, with engravings from some of his works.

The *English Illustrated* contains two illustrated articles on architectural topography, "Reminiscences of Balliol College," by Mr. Andrew Lang, with illustrations by Mr. Harold Tringham; and "A Ramble through Shropshire," by Mr. R. Owen Alsop, with a number of charming sketches of old houses, by Mr. Herbert Raitlon.

In the *Newbury House Magazine* we notice an article on "St. Bartholomew the Great, Smithfield," by Dr. Hayman; and one (unsigned) on "Vandyck as a painter of Children," with illustrations.

In the *Cornhill* "An Egyptian Fragment" is a story turning on the hunting of *curios* in Egypt. "January days in Ceylon" is a pleasant sketch of the country and people.

The *Strand* (October) gives a largely illustrated article on some famous chairs, including sketches of most of those which belonged to the late Mr. George Godwin's collection—a collection which ought never to have been permitted to be dispersed. The series of articles which have long continued in this magazine under the title of "Ziggags at the Zoo" may be mentioned here, in so far as the sketches (which are the chief point in them) show a curious talent at what may be called animal caricature.

London Society includes a short article by Mr. C. Wynn Williams on "Some Poetical Landscape Painters," by which the writer seems to mean people who painted their own effects rather than those of nature; the names he mentions are Danby, Doré, Martin, and Samuel Reade; the latter however was hardly to be called a painter. The other three are rather decayed reputations now, in regard to the higher aspect of art, though their names and efforts are worth recalling; Danby's "Upas Tree" is a really remarkable conception; but this line of art, though a tempting, is hardly intellectually a wholesome one.

In *Belgravia* is a short article "Over the Cordillera of the Andes," giving some account of a route which is still not often traversed or much known.

The most important article in the *Architectural Record* is a profusely illustrated one by Mr. W. H. Goodyear on the "Lotiform Origin of the Ionic Capital," tracing this feature to Egyptian sources.

We have long thought that something might be said on this view of the question, and may return to Mr. Goodyear's article when we have had time to consider it more fully.

The *Journal of Architecture* (Philadelphia) having completed its cycle of drawings of the Orders, is now giving students' competition designs, very much on the Ecole des Beaux-Arts model; a building for a Numismatic Society is the design in the latest number, which, by the way, is dated May, but has only just reached us. In imitating French architectural systems it seems to be thought consistent to imitate also French irregularity in publication.

The *Essex Review* for October continues the series on "Essex Churches" by an article on Great Leighs Church, by Mr. Chancellor, with a considerable number of illustrations.

Among the articles in the *Antiquary* is a note on "A Terramara Village near Parma," by Mr. Robert Munro; "The supposed Roman Bridge at Kenchester," by Mr. H. C. Moore, and on "Celtic Minerals in Upper Wharfedale," by Mr. Speight.

THE SANITARY INSPECTORS' ASSOCIATION.

ON Saturday last the first monthly meeting of the eleventh session of this Association was held at Carpenters' Hall, London Wall, the chair being taken by Mr. Henry Thomas (chief Sanitary Inspector of Bermondsey), who delivered an inaugural address.

Mr. Thomas commenced by calling attention to an omission from a circular issued by the Local Government Board, which he hoped might be a mere oversight on the part of the officials, in issuing invitations to a conference to consider the question of the formation of an examining board for granting certificates to Sanitary Inspectors. Representatives of the Society of Medical Officers and other societies interested in sanitation had been invited to take part in the conference, but the Sanitary Inspectors' Association had not been invited to send a representative. In any conference of the kind the questions to be discussed were of such vital importance that all interested societies should be represented, and, as an incorporated society, he considered that Association had a right to be represented. A Bill had this year been introduced into Parliament to amend the Public Health Act of 1891, in which it was proposed to make medical officers irremovable without the sanction of the Local Government Board. That Bill had fallen through, but another Bill would doubtless be introduced, and he thought the time had arrived when they should endeavour to put before the President of the Board the insecurity of tenure of office of the Sanitary Inspector, in comparison with which the tenure of office by the Medical Officer of Health might be regarded as well secured. The calling of the conference was itself evidence that the Government considered the efficiency of Sanitary Inspectors a State question, and in the opinion of practical sanitarians, which these officers were entitled to be considered, it was one of such importance that no expense should be spared in its successful solution. Schools or colleges should be established for students of sanitary science as they had been for students of the science of teaching, and in such colleges provision should be made for the study of the various diseases to which animals were liable, for the study of building construction, as well as of ventilation, plumbing, drainage, &c. There should also be a building in connexion with a college for the reception of patents and specimens of all the latest sanitary appliances. The students should be taught mensuration and be able to draw plans of drains. Sanitary Inspectors had been described as "discoverers of nuisances," but they were more than that, for they had frequently to teach surveyors, builders, and even professional sanitary engineers their work. If prevention was better than cure, the Sanitary Inspector, whose chief duty was to prevent disease, should stand before the medical officer whose duty it was to cure it. No official ran such great risks of being stricken down by infectious diseases as the inspector of infected premises, and none stood so much in need of protection from interested parties, who were often influential members of vestries and local boards. In order to carry out their duties without fear or favour, Sanitary Inspectors needed a securer tenure of office, the protection of Government, an adequate remuneration, with superannuation as enjoyed by Civil servants. If the 220 Sanitary Inspectors at present employed were increased to 420, at a cost of 40,000*l.*, instead of 20,000*l.*, the

rate of insurance would still be an almost imperceptible tax upon a rateable value of thirty-seven millions sterling, which was that of the metropolis at the present time. The increased outlay would bring in a splendid return in the increased health, strength, and happiness of the people. In concluding his address, the Chairman suggested that the effectiveness of the office of Sanitary Inspector might be greatly increased by relieving him of much of the clerical work he was now called upon to perform, in order to give him time for consultations with ratepayers, owners of property, surveyors and builders, and for self-culture. Above all, the Sanitary Inspector must depend upon his own exertions for success in his work, which he must love and regard as the most responsible. The preservation of life and health was assuredly one of the noblest of all occupations.

The usual vote of thanks was accorded on the motion of Mr. H. Alexander (Shoreditch), the retiring chairman, seconded and supported by Mr. Young (Battersea), Mr. Tidman, Mr. Legg (hon. sec.), Mr. West (Walthamstow), Mr. Fairchild (Wandsworth), Mr. Grant (Chelsea), and by Mr. Middleweek and other members.

A resolution was passed to memorialise the Local Government Board in favour of the insertion of clauses in the new Local Government Bill requiring Sanitary Inspectors to devote their whole time to the duties of their office, giving them more permanent tenure of their offices by making them irremovable from them except for proved misconduct or incompetence, and by giving them the power to issue notices for the abatement of nuisances, such notices to form a basis for legal proceedings, if approved by the Local Authority.

COMPETITIONS.

NORTH LONDON POLYTECHNIC.—The governors of the North London Polytechnic recently invited designs for their new building in Holloway, from the following architects:—Messrs. T. Roger Smith & Son, Keith D. Young, T. Hessel, Tiltman, J. Figgis, J. D. Matthews, W. Harrison, and Charles Bell. Each unsuccessful architect was to receive a fee of thirty guineas. At a recent meeting of the governing body the design of Mr. Charles Bell was adopted, and a section of the work will be put in hand at once.

THE QUEEN VICTORIA NURSING INSTITUTION, WOLVERHAMPTON.—It being proposed to erect a new building for this Institution, upon a site of land having frontages to the Bath and Albany-roads, three resident architects were invited to send in designs in competition, viz.:—Messrs. J. R. Veall & Son, T. H. Fleeming, and F. T. Beck, and at a meeting of the committee the design under motto "Spes," by Messrs. J. R. Veall & Son, has been selected.

CEMETERY CHAPEL, ALTRINGHAM.—The Local Board recently invited several architects to submit designs in limited competition for their new cemetery chapel, &c., to be erected at Hale, near Altringham, Cheshire. In response to this invitation four sets of designs were sent in, and the one submitted by Mr. Wm. Owen, of Manchester, has been accepted.

LEEDS BATHS COMPETITION.—At a general meeting of the Leeds and Yorkshire Architectural Society on November 2, it was resolved, "That the Society view with extreme regret and disapprobation the action taken by Mr. Hanstock in the recent Leeds Bath Competition. That his tender of resignation, dated October 25, 1893, be accepted." The facts are, we are informed, that the Corporation invited designs for public baths, "under motto" being one of the conditions, and advised competitors that something on the lines of the Bailey Baths (at that time being built from Mr. Hanstock's designs) was what they required. Mr. Hanstock competed, marked his plans "Batliensis," and inclosed a photograph of the Bailey Baths, bearing the following words:—"Plan of works just completing by author, cost 8,050*l.* Batliensis." It was argued naturally that Mr. Hanstock might as well have signed his name. The Corporation Baths Committee accepted his design; the Council declined to confirm the selection, characterised the whole business as a scandal, and referred it back to the committee. Eventually the Council eat their own words, and accepted the design. Mr. Hanstock, as a member of the Leeds and Yorkshire Architectural Society, was called upon to explain his action. This he failed to do. A meeting was called to dismiss him; he tendered his resignation, which was accepted with the expression of opinion above recorded. The Society has acted quite rightly. The action of the Corporation it is impossible to understand.

ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS.—At a meeting of the Society of Engineers, held at the Town Hall, Westminster, on Monday evening, Mr. William McIntosh Valon, J.P., President, in the chair, paper was read by Mr. R. Nelson Boyd, on Collieries and Colliery Engineering. The author commenced by referring to the great importance of coal to all works connected with engineering. The output had now reached the enormous quantity of 182,000,000 of tons, which had to be transported by rail, sea, or canal, under the superintendence of civil engineers. After alluding to the old workings before the introduction of machinery, the author pointed out how enormously and rapidly the development of the coal trade took place after the steam-engine was invented, a development which led to the production of the tram and railway. The increase in the depth and extension of the pits produced greater dangers from explosions, which led to the invention of safety lamps and the introduction of mechanical means of ventilation. The application of wire ropes to underground haulage was then referred to, as well as the improvements in shaft arrangements for raising the coal. After briefly alluding to the various methods of working the coal, some data regarding modern explosives were given, and the author passed on to the consideration of the mechanical means of cutting coal, and the modern electrical installations underground for various purposes. The effect of the introduction of machinery on the number of men employed was alluded to, and after noticing the quantity of coal transported on the railways, the important subject of the duration of the coal fields was referred to, especial attention being drawn to the wasteful use of coal and the necessity for economy. A few words were said upon the possible introduction of petroleum as an adjunct to coal, and the reserves of peat which might come into use. The author concluded by reference to the technical development of the railways, which had enabled the output of 182,000,000 of tons at the beginning of the century to be raised up to 182,000,000 of tons in 1892.

THE JUNIOR ENGINEERING SOCIETY.—On the afternoon of Saturday, 21st ult., a large party of members of this Society visited the Tilbury docks of the London and India Docks Joint Committee, and the P.S. *Royal Sovereign*, of the Victoria Steamboat Association. They were shown over the docks by Mr. Seater, on behalf of the superintendent, Mr. R. Adams, who was prevented from attending through illness. The hydraulic power engine and boiler-house, electric light installation, hydraulic travelling cranes, cranes, the dry docks and their pumping machinery, dock deposit-removing apparatus, and other features of engineering interest were seen.

SURVEYORSHIPS.

SELBY.—Mr. William Currey, Surveyor to the Selby Local Board of Health, has been appointed by the Selby Local Board to be their sanitary inspector, waterworks' manager, and surveyor, in the place of Mr. Thomas Mallinson.

LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday afternoon at the County Hall, Strand, Mr. John Hutton, Chairman, presiding.

Mr. D. Martineau was elected an Alderman in the place of Mr. Frederic Harrison, resigned.

Technical Education.—On the recommendation of the Finance Committee it was agreed that the sum of the 30,000*l.* which the Council on March 28 last appropriated for the purposes of technical or manual instruction, being part of the moneys received by the Council under the Local Taxation (Customs and Excise) Act, 1890, in respect of the financial year ended March 31, 1893, should, after deducting 677*l.* 9*s.* 11*d.* for expenses of 2,000*l.* which had been advanced on account of the Technical Education Board, be handed over to that board, as they considered it desirable that the funds should be administered through it by it.

Betterment.—A lengthy report was submitted to the Parliamentary Committee with respect to the Betterment Clause of the London Improvements Bill. The Report gave a résumé of the progress and reception of the Bill in the House of Commons and the House of Lords, which resulted in its return from the House of Lords with the following reasons:—"Because proposals for the assessment of capital values instead of annual rates, and for creating new and arbitrarily

defined areas of taxation, such as are contained in Clause 41 of the Bill, ought not to be embodied in a private Bill but, if found just and equitable, should be based on general principles laid down by Parliament." The agent who had charge of the Bill had advised the Committee that, as regarded procedure, if no further step is taken, a formal Motion would, at the end of the Session, be made for the Bill to be laid aside in consequence of the disagreement between the two Houses, and in that way it would be removed from the proceedings of the House. If the Improvements Bill was to be proceeded with, a Motion would have to be made in the House to accept the Bill as amended by the House of Lords—in other words, omitting the Betterment Clause—and the Bill might in that event be returned to the House of Lords and passed. Having regard to the agent's advice with reference to procedure, the members of Parliament attending the Committee were in some doubt as to what course the House of Commons would be likely to adopt in reference to agreeing to a Joint Committee, having regard to the fact that Clause 41 had been expressly accepted by a majority of 98 on June 25, and by a majority of 133 on August 10. If the House of Commons did not accept or join in appointing a Joint Committee, the passing of the Bill without the Betterment Clause would be the abandonment of the principle of betterment in which other towns besides the Metropolis were pressing forward in private Bill legislation in the coming Session. One member of the Committee, Sir John Lubbock, had urged that the Bill might be accepted without the Betterment Clause upon an explanation being given in the House of Commons to the effect that the Council was willing to proceed in consideration of there being an understanding expressed in the House that the matter shall be favourably considered by the House of Lords. The Committee then recommended—"That the Council do not proceed further with the Bill if the omission of Clause 41 is insisted upon by the House of Lords."

Sir John Lubbock moved the following amendment:—

"That having regard (1) to the importance of the improvements proposed in the Bill, (2) to the fact that the principle of betterment only applies to one of the said improvements, (3) to the small amount expected from it, namely, something less than 10,000*l.* in an expenditure of 1,000,000*l.*, and (4) to the notice of motion by the Chairman of Committees in the House of Lords for the appointment of a Committee to consider the whole question of betterment, the members in charge of the Bill be requested to proceed with it."

In the course of a long speech he asked if anything could be more ridiculous than to refuse to provide an approach on the south side of the Tower Bridge, and so render the new bridge practically useless. If the Council dropped the Bill it would be a case of spoiling the ship for a half-pennyworth of paint. The improvements mentioned in the Bill were of great importance to the metropolis, for, in addition to the Tower Bridge approach, there was the rebuilding of Vauxhall Bridge, a work most urgently needed.

Mr. Martineau seconded the amendment, which, after a long discussion, was negatived, on a division, by 35 to 73.

Mr. Westcott then moved—

"That the Council do proceed with those portions of the Bill dealing with the rebuilding of Vauxhall Bridge, the widening of the southern approach to Woolwich Ferry, and the widening of Wood-lane, Hammersmith, and that the members in charge of the Bill be requested to proceed with the Bill in that limited form."

The Hon. R. C. Grosvenor seconded.

On a show of hands the amendment was lost, and the recommendation of the committee was agreed to.

Proposed Purchase of Tramways.—The Highways Committee reported that on July 25 they submitted a report upon a proposal of the North Metropolitan Tramways Company, that the Council should purchase the whole of the Company's lines in the county of London, that was to say, not only the portion, about nineteen miles in length, for the purchase of which the Council had, under the provisions of Section 43 of the Tramways Act, 1870, given notice to the Company, but the remainder of the Company's lines in the county, which would become purchasable by the Council at various dates up to the year 1909. The Committee then submitted recommendations that the Council should, upon terms which were fully stated in their report, adopt the Company's proposal and should after-

wards lease the undertaking to the Company for a term of twenty-one years. These recommendations were, however, referred back to them, and the Finance Committee was instructed to consider and report upon the financial aspects of the proposals. They had since given further consideration to the matter, and had decided to submit the following recommendation in substitution for those referred back to them:—

"That the Council do proceed with the acquisition of the undertakings relating to the nineteen miles, paying for the same according to the Act of Parliament, and do offer to lease the same (when acquired) to the Company for a term of six years from July 31, 1894, at a rent upon the cost of the purchase; the lease also to contain a provision for a ten-hours' day for the employees on the tramway."

Dr. Grigsby, chairman of the Highways Committee, moved the following amendment:—

"That the Council do apply, under Section 44 of the Tramways Act, 1870, to the Board of Trade for its consent to the purchase by the Council, and to the sale by the North Metropolitan Tramways Company, of those portions of the company's tramways within the county of London other than those with respect to which notice for purchase has been served upon the company under Section 43 of the Act; that if necessary Parliamentary powers be sought for the purpose; and that it be referred to the Highways Committee to prepare and submit for the consideration of the Council the draft of a lease to the company of the whole undertaking."

Mr. Westcott seconded the amendment, but after considerable discussion the amendment was negatived and the recommendation carried.

After transacting other business the Council adjourned at half-past seven o'clock.

Correspondence.

To the Editor of THE BUILDER.

THE INSTITUTE EXAMINATIONS.

SIR,—The letter of Mr. Mountford in your last issue may well be allowed to pass without comment; but I ask you to permit me to state that the place of the gentleman who should have set the question on the occasion referred to will be taken at the forthcoming examination, and I hope on many succeeding occasions, by Mr. Alfred Waterhouse, R.A. ARTHUR CATES.

THE RECENT EARTHQUAKE.

SIR,—Will you allow me to ask the help of your readers in obtaining materials for a memoir on the recent earthquake felt in Wales and the West of England on Nov. 2?

My object in this memoir is to trace as accurately as possible the boundary of the area over which the shock was felt, or the accompanying sound heard, and to draw lines through all places at which the shock was of approximately the same intensity. It would be of great service to know simply the names of as many places as possible where the shock was felt, or the accompanying sound heard. Still more useful would it be to have answers to any of the questions printed below, especially to those numbered 3, 5, and 6. I shall be most glad and thankful to receive accounts from any places whatever, and I may add that no exact account, however scanty the information given, can fail to possess some value or to help in throwing light on the nature and origin of the shock.

- 1.—Name of the place where the earthquake was observed.
- 2.—Time at which it was felt, if possible to the nearest minute.
- 3.—Nature of the shock: (a) Were two distinct shocks felt, separated by an interval of a few seconds? (b) If so, which was the stronger? (c) What was the duration of each and of the interval between them?
- 4.—How many seconds did the shock last, not including the accompanying sound?
- 5.—Was the shock strong enough (a) to make doors, windows, fire-irons, crockery, &c., rattle; (b) to cause the chair, &c., on which the observer was resting to be perceptibly raised or moved; (c) to make chandeliers, pictures, &c., swing, or to stop clocks?
- 6.—(a) Was the shock accompanied by any unusual rumbling sound; and, if so, what did it resemble? (b) Did the beginning of the sound precede, coincide with, or follow the beginning of the shock, and by how many seconds? (c) Did the end of the sound precede, coincide with, or follow the end of the shock, and by how many seconds?

CHARLES DAVIDSON
373, Gillett-road, Birmingham,
Nov. 6, 1893.

SLUGS.

SIR.—If "S. T. T." cannot remove the cause (damp walls), he is likely to have his slug friends as permanent tenants, with a reasonable increase in their number, for they thrive remarkably well on moistened bricks and jerry-builders' mortar, and it is quite possible, by examining the walls in which they lodge, to find a portion of the bricks converted into earth. But to restrict their migratory habits, and prevent them from prowling over the pantry, kitchen, &c., the best remedy will be found in strewing a thick layer of oak or pitch-pine sawdust across the passages which they are known to frequent, and by the walls which they inhabit. Oak sawdust is preferable, on account of the strong acid contained in it. W. S.

The Student's Column.

GEOLOGY.—XX.

SCENERY AND GEOLOGICAL STRUCTURE
(continued).

THE illustrations previously given have chiefly related to the direct action of the agents of denudation, without taking into consideration the class of scenery often produced by them in conjunction with local disturbances, or peculiarities of strata. The following sections are intended to elucidate these and some other features, dealing first with the formation of valleys due to physical disturbances and erosion combined:—



Fig. 1.—Section of a valley of upheaval, Glen Ceiriog, near Chirk, N. Wales.
Llandeilo and Bala beds.

In this case (fig. 1), river erosion has taken place along a line of weakness, caused by the anticlinal bending of Llandeilo and Bala beds.



Fig. 2.—Valley induced by a fault, Glyn-dyfrdwy, N. Wales.
Wenlock Shale.

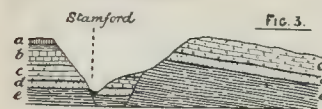


Fig. 3.—Valley produced by parallel trough faulting, Stamford, Lincolnshire.

a.—Cornbrash.
b.—Great Oolite.
c.—Lincolnshire Limestone.
d.—Northampton Sand.
e.—Upper Lias Clay.

Figs. 2 and 3 are examples of valleys, determined, in the first place, by dislocations of strata, forming depressions or weaknesses along which the rivers, by natural drainage, flowed, and subsequently deepened by erosion.



Fig. 4.—Valley of depression, Porthyvaen, N. Wales.

Carboniferous Limestone.

Fig. 4 shows how a slight synclinal fold in Carboniferous limestone has determined the direction of a water-course, which has then proceeded to excavate a valley and to lay down drift gravel, sand, &c. Such valleys are not so common as might be supposed.

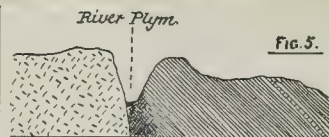


Fig. 5.—Valley of erosion in metamorphosed contact rocks, near Bickleigh, Devon.

a.—Granite.
b.—Altered rocks.
c.—Devonian Beds.

In fig. 5 the Devonian grey and drab slates have been metamorphosed on contact with granite, so that river erosion has been induced along the line of altered rocks.



Fig. 6.—Valley; dip of strata in conjunction with an escarpment, Craigfjord, N. Wales.

Carboniferous limestone and Millstone Grit, capped by Coal Measures.

The phenomena represented in fig. 6 are by no means of rare occurrence; here the slope of the



Fig. 7.—Mountain formed by denuded anticline, Brecon. (After Murchison.)

a.—Old Red Sandstone. b.—Ludlow Beds and Aymestry Limestone.

surface of the country has directed the natural drainage towards the escarpment, which, forming a barrier, has compelled the river thus created to follow along its foot and to excavate a deep valley.



Fig. 8.—Section across Clees Hills, Salop. (After Murchison.)

a.—Old Red Sandstone. b.—Carboniferous Shale and Limestone. c.—Millstone Grit. d.—Coal Measures. e.—Volcanic Rocks.

Fig. 7 is an example of the elevation of rocks by earth movements which have produced much folding, culminating in the formation of a gigantic anticline, since extensively denuded.



Fig. 9.—Mountains formed of extinct volcanoes, Largo Law, Fife. (After Geikie.)

In fig. 9, a is the Lower Carboniferous strata, upon which the volcanoes rest. b.—Ejectamenta from the volcanoes. c.—Necks or throats of the volcanoes filled with basalt, which rock has also

penetrated into b, and may have flowed out at the surface as lava (c'). The dotted lines suggest the original outline of the hills.



Fig. 10.—Section across the Saline Hills, Fife. (After Geikie.)

In fig. 10, a represents tuff, ejectamenta, &c., from volcanoes; b, Basalt of necks; c, Coal Measures. The seams of coal (shown by the thick black lines) are burnt round the smaller hill.

Figs. 9 and 10 are admirable examples of hills owing their origin to the existence of volcanoes that have long since become extinct. It is evident in both cases that extensive denudation has taken place since their formation. Apart from their interest in connexion with the production of physical features, they are eloquent witnesses of volcanic energy in Britain in past geological ages.

In fig. 11, a represents Cambrian grey and purple grits and slates, much dislocated and supporting Lingula flags; b, Lingula flags faulted; c, Llandeilo slates traversed by eruptive dykes (d'), followed by d—bluish-grey and brownish sandstone and slate (Lower Caradoc beds) with felspathic ashes and volcanic grit (d'). e, Upper

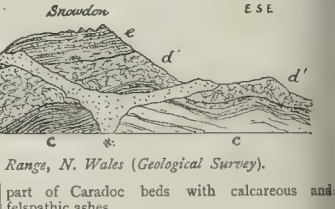


Fig. 11.—Section across the Snowdon Range, N. Wales (Geological Survey).

part of Caradoc beds with calcareous and felspathic ashes.

Thus we perceive that the highest mountain in Wales is the product of denudation on very ancient rocks. The Caradoc or Bala beds are composed of alternations of fossiliferous marine sediments with felspathic ashes thrown out from a contemporary submarine volcano. The actual shape of the volcano is now entirely obliterated, but the student will learn much concerning the nature of igneous rocks by an ascent of the mountain. Many of these volcanic relics, in spite of their high antiquity, have a close resemblance to the products of some modern volcanic vents. Fossils are found on the very summit of Snowdon. The characteristic method of weathering of highly cleaved rocks is also very conspicuous in the district.

THE INSTITUTION OF CIVIL ENGINEERS.—The seventy-fifth session of the Institution of Civil Engineers will be commenced on the 14th inst., and the meetings before Christmas are likely to be occupied, in addition to an address from Mr. Giles, President, with the design and construction of impounding reservoirs for waterworks at Tanus (Bombay), Baroda, and Jeyore, with machinery for the manufacture of bask, and with the development of hydraulic power-supply in London.

LIGHTING OF WINCHESTER.—We are informed that the premium offered by the Corporation of the City of Winchester for the best scheme for electric lighting the city, on the recommendation of their Consulting Engineer, Mr. Morgan Williams, has been awarded to the Brush Electrical Engineering Company.

SOCIETY OF ARTS.—The new Session of the Society of Arts will commence on Wednesday, 15th inst., when the opening address will be delivered by Sir Richard E. Webster, Q.C., M.P., Chairman of Council. For the subsequent Wednesday evenings before Christmas the following arrangements have been made:—Nov. 22nd, "Conformation of the Horse from the Artistic Point of View," by Capt. M. H. Hayes. Nov. 29th, "The Regulation of Street Advertising," by Mr. Richardson Evans. Dec. 6, "An Artist's View of Chicago and the World's Fair," by Mr. Frederic Villiers. Dec. 13, "Carriage-way Pavements for large Cities," by Mr. Lewis H. Isaacs. Mr. Henry Blackburn will deliver a course of Cantor lectures on "The Art of Book and Newspaper Illustration," on Monday evenings, Nov. 27, Dec. 4, 11. The Juvenile lectures, delivered during the Christmas holidays, Jan. 3 and 10, will be on "Plants: their Foes and Defences," by Mr. Walter Gardiner, M.A., F.R.S.

GENERAL BUILDING NEWS.

CHURCH OF ST. LUKE, WARRINGTON.—On the 11th ult. the Church of St. Luke's, Liverpool-road, Warrington, was consecrated by the Bishop of Liverpool. The new church, says the *Liverpool Post*, was begun in May, 1892, Messrs. Bodley & Garner, of London, being the architects, and Mr. R. Franklin, Duddington, Oxfordshire, being the contractor. The site is walled off from the highway by a stone wall, and the church stands back a few yards. The building has been erected in Runcorn and Helsby stone, and has a red tiled roof. The outside walling is pitched or rock-faced, with four buttresses, while the interior is plain plastered. The length of the building is 116 ft., and the height to the eaves 16 ft. The width of the porch inside is 45 ft., and the height to the top of roof 35 ft. On entering the building the cause and effect of this pointed roof is apparent, says the before-mentioned journal, as Mr. Bodley has made it the occasion of introducing his design, which may be described as that of a central leading. To give effect to it the nave has been divided lengthways into two arcades, separated on each other by five central columns, which rise to a height of 17 ft. 6 in. to the top of the cap, when they arch upwards to the roof, the apex of the arches being at a height of 28 ft. from the ground floor. The columns themselves are fluted and moulded, but devoid of decoration except a small arch and a rosette round the capital. They were originally intended to be having an arcade on either side, but during the course of erection sufficient contributions were received to justify the committee to build an aisle on the north side. This aisle is separated from the nave by five almost square pillars topped by low arches. The keystone of the chancel arch forms the springer of the north arcade, and is in the form of a shield, which was originally intended to be having an angel bearing a shield. The chancel, which is 3 ft. 6 in. wide, and 36 ft. long, is cut off from the nave by an oak screen. The five broad steps leading to the altar are paved in York stone, blue and brown set diagonally, while the altar itself is of a plain oak table, the choir stalls being of a similar description. The tapestry which covers the altar was designed by Mr. Bodley. The roof is regular, divided into spaces with a green background, and with a floral decoration running along the centre. The chancel window is of three lights, and there are also three on a smaller scale on the north side. The two west windows are similar to the east window, except that they are of two lights instead of three. On the north side of the building there are five traceried three-light windows, square-headed inside and arched inside, while those on the south side, three in number, have more pointed ones. There being no pews, the floor is set in wood blocks, with cement gangways. The heating on Haden's hot-air principle. All the doors (the principal entrance is on the south side) are of plain oak. There will be accommodation for 500 persons. The building has been erected at a cost of 5,400.

GASHOLDER, ABERDEEN.—The contract for the new work of the additional holder in connexion with the Corporation Gasworks—to be erected on the low ground at Gallowhills, near the Old-town Links—has been secured by the Barrowfield Ironworks, Glasgow, at the price of 21,200. The concrete tank, which is 210 ft. in diameter and 40 ft. deep, and has cost 13,000, was constructed by the Town Council without the intervention of a contractor, opportunity being taken of giving work to men otherwise unemployed. The holder is a three-lift one, the diameter of the outer lift being 207 ft. and the depth 16 ft. The standards will thus be 125 ft. in height above the top of the concrete. The new gasholder, which has been necessitated by the extension in capacity, is capable of containing four million cubic feet, equal to 1½ days' consumption of gas in Aberdeen at the present rate, and is said to be the second largest gasholder in Scotland. The engineer for the works is Mr. Alexander Smith, superintendent, Aberdeen Corporation Gasworks.

PUBLIC HALL, LAW, LANARKSHIRE.—On the 11th ult. Law Public Hall was opened. The building occupies a site near the junction of the Law Hill and the W. Roads, and on the south side of the village. It has been erected from the designs of Mr. John L. Murray, of Heavyside. The building has two transepts, and has its western gable filled by five large windows. On the eastern side there is a smaller hall with clock and lavatory. The larger hall is capable of holding 400, and the smaller hall to be used as a library. The contractors were:—Mr. W. Weir, builder, Carlisle; Mr. Ferguson, mason, Glasgow; Mr. Hislop, plumber, Carlisle; Mr. Glaister, slater, Lanark; and Mr. Harvey, painter, Glasgow.

RESTORATION OF TOWER, OUNDLE CHURCH, NORTHAMPTONSHIRE.—The restoration of the tower of St. Peter's Church, Oundle, has just been completed. The state of the tower was reported upon by the Archdeacon of Oakham in 1891, and as a result Mr. J. T. Micklethwaite, architect, of Westminster, was consulted on the matter, and it was decided to carry out the work proposed. The whole of the decaying stones in the tower have been replaced and the buttresses rebuilt. In addition to the restoration of the tower, the roofs of the north and south transepts, and also that of the south aisle have been repaired, and the total expenditure in con-

nexion with the work up to the present time has been nearly 1,500. Still further work is yet required to be done to the fabric generally. The restoration was entrusted to Mr. J. W. Irwin, builder, of Oundle. The work was entrusted to Mr. C. J. Turner and Mr. G. Berridge, and the lead work was executed by Mr. W. Garratt.

SCHOOL-CHURCH, DENABY MAIN, YORKSHIRE.—On the 23rd ult. the new school-church built by the Denaby Main Colliery Company, at Rossington-street, Denaby Main, was dedicated by the Bishop of Beverley. The building is not far removed from the old schools, and between 4,000, and 5,000, has been spent on it. Its chief external feature is a tower internally, a room, capable of seating 800 people, has been provided. It is so arranged that a screen may be drawn between the chancel and the body of the church, in order that the latter may be used for school purposes, when required. But independent of this there are class-rooms which have accommodation for 840 children. The building has been erected from plans by Mr. Smithers, of Hill Top, and the contract has been in the hands of Messrs. Arnold & Son, builders, of Doncaster.

FREE LIBRARY AND MUSEUM, PRESTON.—The Harris Free Library and Museum at Preston was opened on the 26th ult. The building is Greek in style, and the main entrance is approached by a broad flight of steps. On this side of the building is the pediment, the sculptural group on which was designed by the architect, Mr. J. Hibbert, of Preston, and was executed by Mr. Koscoe Mullins. In the interior the arrangement of the rooms is as follows:—Basement, comprising librarian's work-room, museum storage, heating, and lighting department, &c. Ground floor, comprising lending library, patents' library, reading-room, news-room, &c., and collection of models and examples connected with the industrial arts. Principal floor (to which there is a main entrance, used on ceremonial occasions, from the portico in the Market-place) comprising the Reference Libraries—including the Shepherd Library—entrance-hall and staircase, and museum of casts and reproductions from the antique. Upper floor, comprising the Museum galleries, central hall, and staircase. The art galleries will contain the Newsham collection of pictures and drawings of the British school, valued at 40,000.

WESTMINSTER GUILDHALL.—As our London readers are all aware, the Guildhall at Westminster has been recently enlarged and architecturally entirely remodelled, in accordance, we are told, with the spirit of the surrounding architecture, which is mostly Gothic; though we must say that the small prim old Classic building had a certain architectural quality about it, the memory of which is not extinguished by the new building. The original Westminster Guildhall stood, as far as is known, at the north-west corner of what is now Parliament-square.

In 1805, the Guildhall was rebuilt from designs by Sir P. Cockrell in its present position, said to have been the site of the beiry of the old Sanctuary Church. Later, the old building was found inadequate for its purpose, and plans submitted to the Council for its reconstruction were approved by them in December, 1891. The alterations affected the entire structure to such an extent that it was found necessary to remove the office of the Council to temporary premises, but the sittings of the Justices at the Quarter and Intermediate Sessions have, although with some slight amount of necessary inconvenience, been held regularly in the building throughout the progress of the works. The foundations and walls of the old building were retained throughout, and the increased weight superimposed upon the former, owing to the extension of the accommodation of the building, necessitated the utmost care and caution and a very considerable amount of underpinning. The actual cost of the works cannot be determined at present, but the inclusive outlay may be estimated at about 23,000. Among the chief features in the interior are the retention of two Courts for the accommodation of the Justices, and whilst the first Court has remained nearly unaltered, the second Court has been entirely refitted in the most commodious manner, including a gallery for the convenience of jurors in waiting. The planning of the building has been carefully considered with a view to the suitable grouping of the several rooms and offices, thus: In the basement, from what were formerly the vaulted cellars, have been provided the prisoners' wardens' and police departments, with direct access to the courts together with the waiting and retiring rooms and offices appropriated to the witnesses in waiting; also extensive fireproof rooms for the reception of the county records. The kitchen of the housekeeper, with its offices, &c., and the furnace-room, with coal and general stores, are also on this floor. On the ground floor are grouped the private and general offices of the Clerk of the Peace and the Clerk and Treasurer of the Council; and also the luncheon and retiring rooms for counsel, barristers, magistrates, and Judges, these all communicating by means of a wide corridor with the two Courts. The first floor, which is reached by four staircases, is chiefly devoted to the committees of the Council, with the necessary waiting-rooms and offices. There are also on this floor the private rooms of the Chairman and Vice-Chairman of the Council, the Chairman of Quarter

Sessions, and waiting and retiring rooms for juries, &c., &c. On the second floor is situated the new octagonal chamber, especially designed and fitted for the meetings of the Council, together with a suite of ante-rooms attached thereto for the use of the aldermen, councillors, and others. The south front of this floor has been appropriated to the use of the County Surveyor. The materials used are red brick and Portland stone, and the works have been carried out from the designs and under the superintendence of Mr. F. H. Pownall, F.R.I.B.A., the Architect and Surveyor to the Council, by Messrs. Higgs & Hill, of Lambeth, who obtained the contract in competition, from quotations prepared by Messrs. Young & Brown, of Southampton-street, Bloomsbury.

FREE CHURCH, AYR.—On the 2nd inst. the new Church of St. Andrew's, Park Circus, Ayr, was opened by the Rev. Dr. Stalker. The church is Gothic in style, of the late Decorated period, and Scottish features of that period have been freely used in the detail. The main gable, which fronts the Circus, has three small windows, with cusped and traceried heads in the lower part, and over these a large window of seventeen compartments, with moulded tracery, occupies nearly the whole gable. The gable is flanked with buttresses, which terminate in carved pinnacles. At one side is an octagonal turret staircase, which is panelled and moulded in the upper stage, and has at the ground stage a projected doorway with moulded arched head. At the other side is the tower and spire, the latter rising to a height of 150 ft. At the base of the tower is a projected porch, forming the main entrance. The church is planned internally into nave and side aisles, and has galleries at the sides and end. The galleries are carried on corbels projecting from the walls, which divide the interior into three bays on each side. Behind the pulpit the organ chamber is recessed with a moulded stone arch rising from clustered columns, and a wood screen of open tracery is carried across the opening from each side of the pulpit. The pulpit woodwork is similar in character, and a low screen of cusped woodwork encloses the choir space in front. The work is from the designs and under the superintendence of Mr. John B. Wilson, architect, Glasgow, whose plan was selected in a limited competition, and the work has been executed by the following contractors:—Mason: Ferguson & Sinclair, Glasgow; Wright: J. & D. Meikle, Ayr; plaster: J. Leggat & Son, Ayr; slater, plumber, and gasfitting: Drinnan & Murphy, Ayr; glazier and painter: A. & H. Gilchrist, Kilmarock; heating: Boyd & Son, Paisley; gates and railings: Murdoch & Cameron, Glasgow; with Mr. R. B. Dalzell as clerk of works. The total number of sittings is 760, and the cost, inclusive of tower and spire, will be about 5,000.

WESLEYAN CHAPEL, BAGBY, YORKSHIRE.—On the 1st inst. the new Wesleyan Methodist Chapel erected in Bagby, Thirsk, was opened. The chapel is of Gothic style, and has been built on the site of the old building, from plans drawn by Mr. Stokes, architect, Thirsk, and the work has been carried out by Mr. J. R. Manfield, builder; Mr. F. Pollard, joiner; Mr. G. Best, plumber; Mr. J. Rutherford, painter; and Mr. W. Dodgson, slater.

WESLEYAN CHAPEL, WATH-ON-DEARNE, YORKSHIRE.—Memorial-stones of a new Wesleyan Chapel at Wath-upon-Deane, of 4,000, were laid on the 1st inst. at Wath-on-Deane. The church is to be in the Early Gothic style, and will provide accommodation for about 700 worshippers. The architect of the proposed church is Mr. J. Wills, of Derby; the builders, Messrs. Walker & Slater, of Derby; and the mason, Mr. R. Snell, of Masborough.

OXFORD NEW MUNICIPAL BUILDINGS.—Mr. Chappell, of London, who a few months since obtained the contract to erect the new municipal buildings at Oxford, having failed with liabilities 220,000, of which 177,000, are stated to be secured and 43,000, unsecured, with assets not yet ascertained, the Oxford Corporation have been placed in an unexpected difficulty. Firms who had originally tendered at the lowest prices having been communicated with, it was found that Messrs. Willcocks & Co., of Wolverhampton, required 5 per cent. in addition to their former tender—55,557, + 2,777, = 58,334. Messrs. Parnell & Son, of Rugby, offered to carry out the contract for 56,876, instead of their former tender of 55,264, being an increase of 1,600. The amount of Mr. Chappell's contract was 51,380. The Oxford Corporation have resolved to accept the offer of Messrs. Parnell & Son.

NEW SCIENCE BUILDINGS, CAMBRIDGE.—The new science buildings at the Leys Schools, Cambridge, were opened by Lord Kelvin on the 28th ult. The building has been built by Mr. Wm. Saint, of Cambridge, from the design of Mr. R. Curwen, London, and the style follows out the permanent plan of the north block of the school. There are elementary, biological, and physical laboratories; in the basement there are chambers where explosives and dangerous compounds will be treated; upstairs there are three lecture rooms, the largest of which has been named the Kelvin-room; and in the gallery over the lecture room is a library, a distilling-room, and a dark-room for photographic work. The building cost a little over 4,000.

SANITARY AND ENGINEERING NEWS.

THE WASTE WATER QUESTION AT DUNFERMLINE.—The question of waste water has for some time past been engaging the attention of the Dunfermline authorities. Two Deacon meters were recently erected, and a waste water inspector was appointed. The meter diagrams have just been handed to Messrs. Leslie & Reid, Edinburgh, and at a meeting of the Town Council on the 26th ult. a report by the engineers was submitted. They point out that the consumption before inspection was 1,341,600 gals. per day, which, after deducting 390,000 gals. for trade and district supplies, left 951,600 gals. for domestic use, or about 40½ gals. per head per day. After inspection the consumption was reduced to 1,025,700 gals., or 635,700 gals. after the same deduction was made, and this was equal to about 27½ gals. per head per day of domestic consumption. Although this, the engineers say, shows a vast improvement on former conditions, there is still a great deal to be done in the way of reducing waste, as the night flow is at the rate of 16.6 gals. per head per day of twenty-four hours, after deducting meter supplies, and the greater portion of this must be preventable waste.

SEWERAGE WORKS AT CARDIFF.—At Cardiff Town Hall on the 27th ult. (before Colonel Ducat, one of the inspectors of the Local Government Board), an inquiry was held into the application of the Cardiff Corporation for powers to borrow 86,500*l.* for the purposes of constructing the outfall sewer at Grange town, and to enlarge the outfall sewer for Roath running through Splotlands. Evidence was given by the Mayor and the Borough Engineer (Mr. Harpur) showing that the western district sewer, which was built by Lord Windsor and purchased by the Corporation in 1875, had now become inadequate to meet the requirements of the largely-increasing population, particular emphasis being made with regard to the flooding of the houses situated in the lower part of Grange town during wet weather.

PROPOSED SEWERAGE DISPOSAL WORKS, MANCHESTER, GLOUCESTERSHIRE.—On the 24th ult. Colonel W. M. Ducat, R.E., Local Government Board Inspector, held an inquiry at the Young Men's Institute, Staple-hill, to obtain evidence with regard to an application by the Sanitary Authority of the rural sanitary district of the Keynsham Union for sanction to borrow the sum of 19,000*l.* for the purpose of constructing works of sewerage and sewage disposal for the contributory place of Mansfield. Mr. Nicholson Lailey, representing the firm of London engineers who have prepared plans of the suggested sewerage works, gave evidence with reference to the scheme.

NEW AVIEMORE RAILWAY, N.B.—On the 24th ult., a number of the directors of the Highland Railway Company made an inspection of the works of the new through line, from Aviemore to Inverness. The first section, from Aviemore to Carr Bridge, has since its opening proved of great service to the district. The second section, from the river Dulnan to the river Findhorn, has been under construction by the Messrs. Kennedy & Son, Glasgow, during the past two years, but owing to the very heavy nature of the work progress has been somewhat slow. The viaduct across the Dulnan, which is 180 ft. long and 34 ft. above the river, and the viaduct at the Pass of Slochd-Mini, 400 ft. in length, and 100 ft. above the level of the declivity, are both, however, in an advanced state. This part of the contract amounts to 76,625*l.*, or about 10,000*l.* a mile. The third section, from Culdoich to the banks of the Findhorn, is in the hands of Messrs. John Ross & Son. The contract price for this part was 87,129*l.* Messrs. William Alexander & Co., Inverness, who secured the contract for the building of the Findhorn viaduct for 24,264*l.*, have made good progress. The piers of the viaduct, which rise to a height of 140 ft. above the river, are well advanced, and already give a good idea of the importance and substantial nature of the structure. A good commencement has also been made by the Messrs. Mackay, the contractors, with the last section of the line from Inverness to Culdoich, a distance of eight miles. The foundations for the piers are being laid to carry the large viaduct across the river Nairn, and the embankment is now all but completed to the point from which the viaduct will begin. Operations are being carried on along the route, and Mr. Milburn the iron bridge has been erected and a commencement made with the embankment by which the new line will be brought to the point where it will join the present Inverness and Perth Railway. The works have during the past two years given employment to large numbers of men.—*Scotsman.*

SHIPLEY SEWAGE SCHEME.—The Shipley Local Board held a special meeting on the 2nd inst., when a decision was come to with reference to a scheme of sewerage and sewage treatment for the Local Board's district. It was stated that the committee had had before them the schemes of three different engineers, and a great deal of time had been devoted to the consideration of these schemes. One scheme was crude, and gave little information of any kind. A second scheme was worked out as a combination of gravitation and pumping, the sewage to be treated on land within the Board's district. The third scheme was one of gravitation, the sewage being carried through the lowest parts of the district to Esholt, where it was proposed that the

outfall works should be situated. Neither of these schemes appeared to the Sanitary Committee to be quite satisfactory. But after a careful consideration the committee had decided to recommend the Board to adopt the scheme submitted by Mr. M. Paterson, with the alteration that instead of taking the sewage to Esholt to be treated, land should be purchased at Dockfield, near the junction of the Bradford and Leeds and Liverpool Canals, where a pumping-station and sewage desiccation works should be erected. It was proposed also that a refuse destructor should be put up on the same site, or some equivalent for burning the asphalt refuse. The proposal of the committee, having been formally moved and seconded, was adopted. The estimated expenses of the new scheme are as follows:—Sewers, 9,300*l.*; pumping-station, 2,400*l.*; sewage works, 4,062*l.*; land filtration works, 3,717*l.*; contingencies (engineering difficulties, law costs, &c.), 2,482*l.*; making a total of 23,569*l.*

FOREIGN AND COLONIAL.

FRANCE.—The question of the rebuilding of the Opéra Comique will be definitely settled shortly. M. Bernier has just published a modification of his design in accordance with some of the suggestions which have been addressed to him, and the modified design is now the subject of a report which M. Charles Garnier is to present to the Comité des Bâtiments Civils.—M. Barrias, the sculptor, is just completing the monument to be raised to the memory of Emile Augier on the Place de l'Odéon. The monument is composed of a stele of coloured marble, supporting the draped bust of the dramatist. The stele is surrounded by eight figures, representing "Sappho" and "Aventurière," his two principal creations, and a child holding in one hand a wreath and in the other a comic mask.—M. Théophile Bourgeois, architect to the municipality of Poissy, has obtained the first premium in the competition opened at Argenteuil for an abattoir. The second premium has been awarded to M. Macaigne, and the third to MM. Girod and Henneguin, all of Paris.—A committee is being formed to raise a monument at Paris to Gounod. There is some talk also of giving his name to Rue Boudreau, near the opera.—M. Corolleur Hervé has been appointed architect to the Municipality of Avallon, in place of M. Henri Prévost, resigned.

The municipal council of Vitre has set on foot a subscription to raise a monument to Mme. de Sévigné in that town.—On Sunday last was inaugurated, in the presence of the President of the Republic, the monument raised in memory of the victory of Wattignies. M. Léon Fagel, the sculptor of the monument, received the decoration of the Legion of Honour on the occasion.—In making some excavations in the prison of St. Lazare an ancient crypt has been found and some carvings which are well preserved. At the entry of this same crypt are to be traced the remains of the canal cut by the Lazarites to bring water from a spring to the convent.—M. Théophile Habert has been appointed curator of the Museum of Ceramic Art and Archeology at Reims.—It is proposed to exhibit shortly, at the Ecole des Beaux-Arts, the monument of Félicien David which Chapu had left unfinished at the time of his death, and which was completed by his pupils. The monument will be inaugurated towards the end of the year in the cemetery of St. Germain-en-Laye, where is buried the author of "Désert" and "Lalla Roukh."—A committee has been formed to raise a monument to La Fontaine at Fontenay-aux-Roses.—M. Pierre Rambaud, a talented sculptor, has died at the age of forty. He was a pupil of Joffroy and Chapu, and had received medals in 1881 and the three following years; he also received awards at the exhibition of 1889 and the Salon of 1890. Among his works may be mentioned "Bayard Enfant," "Mise Champêtre," "Le Pâtre," &c. He had two works at the last Salon, "Martyre" (plaster) and "Providence" (marble).

The painter Ferdinand Bonheur, cousin of Rosa Bonheur, has just died at Asnières, aged fifty-six.—M. Karl Bodmer, painter, has died, at the age of eighty-five. He was born at Zurich, but had long been a naturalised Frenchman. He was a distinguished landscape painter, but was perhaps more especially known as a draughtsman and engraver, whose works of this class, most laboriously executed, were highly appreciated by his friends Diaz, Millet, and Théodore Rousseau. He excelled in the representation of the various animals which were to be found wild in the forest of Fontainebleau, in which he lived, at Barbizon, the well-known artist's hamlet.—We have also to record the death of M. Henri Meurillon, an architect of Lille, at the age of sixty-eight. He was a member of the "Société des Architectes du Nord du France."

GERMANY.—The foundation-stone of a new German Lutheran church has been laid at Jerusalem.—The Agricultural Society has been annually opening competitions for designs for utilitarian buildings for farmers and others interested in agriculture. This year the premiums are to be given for the best design of a pig-sty. There will be a committee of experts to act as assessors. The competition for the designs of the provisional buildings which are to be erected at Erfurt for the Thuringian Industrial

Exhibition, has been decided in favour of Messrs. Traue & Klepzig. The second premium went to Strasburg, the third to Leipzig.—The best mode of combatting the smoke nuisance is the subject of a competition opened by the Society of German Engineers, with a first premium of 300*l.* The sending-in day is December 31, 1893. There will be ten assessors. At a similar competition held some time ago, none of the premiums were awarded, though there were six competitors.—At Stuttgart, some valuable premiums are offered in connexion with a competition for designs of a new school building of some pretension, the cost of which will be about 27,000*l.* The committee of assessors includes the city architects of Berlin and Leipzig.—A very popular Berlin builder and contractor, Schmidt, has bequeathed about 1,250,000 marks (or some 62,000*l.*) to the municipality of Berlin, for the erection of a founding hospital. This will be the first institution of the kind in Berlin.

SWITZERLAND.—An exhibition of the Swiss national industries is to be held at Geneva in 1896. An extensive site has been selected, which will have double the superficial area of the similar exhibition held some years back at Zurich. A competition has been opened for plans of the proposed exhibition ground and the designs of the main buildings.—According to the official report on the meeting of the delegates of the amalgamated societies of Swiss architects and engineers, which has been held at Lucerne, about fifty representatives were present to discuss the proposed revision of rates for professional charges. The delegates approved of the list of rates which was put before them by their special committee of thirteen members, and the new scale of charges will hold good throughout Switzerland, and will be accepted in courts of law as the customary ones. Herr Burkli-Ziegler has resigned the presidency of the central committee of the societies, and his office is to be filled by Herr Geiser.—In connexion with the business meeting of the delegates, a general gathering of members of the architectural societies was likewise held at Lucerne. One hundred and thirty-eight members were present. The next gathering will be in 1895 at Berne.

TURKEY.—The idea of getting up an "International" Exhibition at Constantinople has actually been mooted, but unfortunately the promoters have now contented themselves with an arrangement of a "National Fair." The architects' plans have been accepted by the Sultan. The proposed site is in the suburb Schischli, the superficial area required being about 142,000 square metres.—At Damascus the historical mosque Dscheami-el-Rebir, was destroyed by fire last month, owing to the negligence of workmen who were repairing the roof. The last time this mosque was burnt down was in 1609.

MISCELLANEOUS.

SURVEYORS' INSTITUTION EXAMINATIONS.—About 250 candidates from all parts of the United Kingdom have already sent in their names for the various examinations to be held in January and March next, and this number will probably be considerably increased before the end of the present month. Out of the 250 candidates above-mentioned upwards of 220 have entered for the Professional Examinations, that is, 159 for the Associateship and 63 for the Fellowship. The Professional Examinations will be held, as for some years past, in the Medical Examinations Hall, Victoria Embankment, during the week commencing Monday, March 12.

BUILDING MATERIALS, &c., IN TANGIER.—According to a recent report of the British Consul at Tangier upon the trade of that district, the quantity of building materials imported continues to increase, as it has been found more satisfactory to import ready-made woodwork and other materials than to procure them locally. A project is being discussed for introducing various improvements in Tangier in the way of better repair of roads, sanitation, scavenging, &c., the principal work to be undertaken being a supply of water to the town, which will necessitate an increased supply of building materials. During last year bricks, fancy and roofing tiles were imported to the amount of 6,216*l.*, of which 80.1 per cent. came from France and 19.9 per cent. from Spain. There would be a larger importation of bricks were it not that considerable quantities are made locally. The value of cement imported was 1,262*l.*, or 3s. 11d. per cwt., of which only 33 per cent. came from Great Britain, the remainder being mostly French, which is preferred on account of cheapness. Gypsum from France amounted to 378*l.*, or 2*l.* 1s. 10½d. per ton. Planks and timber, principally Swedish, amounted to 9,550*l.*; paints to 1,115*l.*; iron rafters from Belgium to 3,000*l.* Wages have risen, and range from 2s. 6d. to 5s. 6d. per day for carpenters, masons, &c., and from 10s. to 15s. per day for labourers.

ELECTRIC LIGHTING IN ABERDEEN.—At a meeting held at Aberdeen on the 26th ult. to consider the lighting of the city by electricity the line of the proposed illumination was discussed. It was decided that the area should extend from the top of Justice-street to Union Bridge, and that eight street lamps would be sufficient. The proposed sites for the lamps are the top of Justice-street the

main in Castle-street, Union Buildings, opposite the end of Broad-street, near the Bank of Scotland, and Market-street, end of the City Church-façade, Trinity Hall, and the junction of St. Nicholas-street and Correction Wynd. The proposal that the lamps should remain lighted till midnight, or which time the ordinary street lamps will be employed, and estimates will be prepared showing the estimate of cost between the two systems. The estimate for the installation of the electric light to shops and houses in the central area of the city has now been laid.

REDEDOS, ST. JUDE'S CHURCH, MOORFIELDS, EFFIELD.—The dedication of the memorial redodos which has just been erected in St. Jude's Church, Moorfields, in memory of the late Rev. John Chester, took place on the 28th ult. The redodos was designed by Mr. Grenville Chester, of the firm of Messrs. Harry Hemis & Son, Exeter, who have carried out the work. It is of the fifteenth-century Gothic character, carved right up from the ground, and occupies the full length of the east window. Over the super arch the redodos consists of three distinct panels. The central panel, which is a carved and pierced canopy, is deeply recessed, and contains a representation of the Crucifixion. The panels on either side are carved with tracery, interspersed with medallions and conventional fruits and flowers. The whole is surmounted by carved finials and crests, and is flanked by pinnacles.

ENAMEL APPLICATION FOR IRON.—Messrs. Fletcher Russell & Co., of Warrington, send us a specimen of iron-work the surface of which has been treated by a process which the patentees state will prevent rust, while it admits of the application of any colour to the surface of the metal. The process is described by the makers as consisting in the application of a very thin film of enamel, so thin that the minute details of surface of the iron are not concealed or interfered with, although its colour is changed. This is borne out by the specimen sent to us, in which different portions of the metal are differently coloured, but the granular surface characteristic of cast-iron is in no way obliterated. Whether the process is really such a preservative as it is claimed to be, can, of course, only be ascertained by time or chemical testing. The process is entitled "Chimatto Enamel."

BOARD SCHOOL SUPPLY: LONDON.—The School Board for London have just issued their yearly schedule of sites, which they propose to acquire for building new schools or enlarging their present school premises. The Board's requirements show a considerable advance, when compared with the additional provision for each of the last three years. The gross number of chosen sites is fifty-eight, of which fifty-three will be taken, covering a net total of about 133,824 square yards, or very nearly 27½ acres, after reckoning a margin for such couple of alternative sites; and distributed amongst the several electoral divisions thus: City—two houses in Stoneys, next Gravel-lane, Houndsditch School, Chelsea—market-garden ground in Fulham Palace, and in Peterborough-road, Fulham; four houses and land next Victoria School, Hadyn-park-roads, and next Victoria School, four houses, with a large garden, in Grosvenor-road, Greenwich, and in Gilling-road, and opposite the old school house in Wickham-lane (alternative), and land in Wrotesley-road, Plumstead. Three houses and land next Randall-place School, and next Old Woolwich-road School, Greenwich. Four houses adjoining Clifton-road School, four houses in Regent-street, and land next Creek-road School, Deptford. Hackney—nine houses and land in Albion and Queen's roads, six in Sigmond-road or eight in Dalston-lane, five with gardens in Tottenham-road School, two next Enfield-road School, two parcels of land in Berger and Mandeville-roads, St. John's, Hackney, parish. Four houses in Hartley-street, next Bonner-street School, five in Mansford-street, Bethnal Green, and land in W North-place, adjoining Scrutton-street School, Reddish. East Lambeth—Eighteen houses in New, Faraday, and South streets, Newington; and five, with gardens, at Peckham Rye, St. Giles's, Newbury, parish. West Lambeth—Eleven houses, with gardens in Holland-road, and some garden ground next Gipsy-road School, St. Mary's, Lambeth. Two (alternative) plots in Idmiston-road, Lambeth, and Thurlow Park-road, Streatham. One (alternative) plot at St. Ann's Hill, and The Ve, Earsfield, and two similar plots in Hazlestead and Magdalen roads, Wandsworth; part of Hyde Farm Estate, Dragmire-lane, Balham. Fourteen houses, with gardens, in Haverhill-lane, Haverhill-road, and garden ground next Haverhill School, St. Pancras. Ten houses in Sarsfield and Nightingale streets; eleven next Stephenson School, and one next Bell-street School, St. Eglebone parish. Southwark—fifty-six houses, with gardens, in Forecourt, &c., and premises in St. Monnow, Keeton's, and Neckinger roads, St. Eglebone, East-lane, and in Renscombe and Alexis streets; Bernondsey. Four houses with yards, &c., Westminster Bridge-road, adjoining Webber-road, Tower Hamlets—land in Gengal-road, and sixteen houses in Dean and Blakesley streets, St. George's-in-the-East; eighteen in Cullostree; factory premises and three houses, St. Hard's-street, Bromley (being the Old Palace

site); and land adjoining Bromley Hall-road School: St. Leonard, Bromley, parish. Five houses in Turner's-place, and roadway, adjoining Northey-street School; and fourteen in Acland and Walker streets, next Thomas-street School: Limehouse. Twenty-two houses in Portman-place and North-square, with a roadway, next Portman-place School, Mile-End Old Town. Westminster—twelve houses in Berwick-street, with builder's yard, and workshops in the rear, St. George's, Hanover-square. The Board also mean to enlarge their Brentford Industrial School, by taking a parcel of about 27,810 square feet in Cornsland-road, Shenfield. The net totals for last year were 9 a. 14 p. for eighteen sites.

CHANGE OF ADDRESS.—We are informed that Mr. George Wragge, art metal-worker, has removed to 22, Surrey-street, Strand, W.C.

THE FIRM OF JAMES HILL & CO., LOCK MANUFACTURERS.—We recently noticed the decease of Mr. James Hill, and we now understand that the firm of James Hill & Co., lock manufacturers, will be continued at the same address, 100A, Queen Victoria-street, E.C., by the surviving partners, Mr. E. J. How and Mr. W. W. Hill, who for many years have had the joint management of the business.

TRADE NOTICE.—Messrs. Adams & Co., sanitary engineers, of London, York, &c., ask us to mention that the Northern half of Ireland, including Belfast, Londonderry, &c., will in future be supplied and controlled from their Glasgow office, 107, St. Vincent-street, to which all communications from this district should be in future addressed.

LEGAL.

COTTON AND OTHERS v. THE CORNISH BANK, LIMITED.

THIS was an action, in the High Court of Justice, Chancery Division, for an injunction to restrain the defendants from erecting, on the site of the new Cornish Bank at Helston, Cornwall, any building, wall, or structure, so as to darken, injure, or obstruct any of the ancient lights of the premises belonging to the plaintiffs.

The statement of claim alleged that the plaintiff, Martha Cotton, was the owner of a dwelling-house, shop, and show-rooms, situated at the junction of Menage and Wendron streets, Helston, for the residue of a term of years (determinable on lives), and that the plaintiffs Read and Roberts were in actual possession of the premises, and carrying on an extensive business as mercers, drapers, dress-makers, and milliners. The plaintiffs alleged that until the commencement of the defendant's building operations there stood on the site of Wendron-street, opposite to the plaintiffs' premises, a low building, which was 24 ft. 6 in. high, the distance between the two buildings being 19 ft. 5 in., including the pavement. The plaintiffs further alleged that the defendants had recently pulled down the low building, and had commenced and were continuing to erect certain new buildings on the same site, and that such new buildings, though still unfinished, had already reached and exceeded the height of the old building, which would materially and substantially interfere with the access of light to their seven windows facing into Wendron-street. The plaintiffs also claimed alternatively for damages.

The defendants pleaded that only two windows of the plaintiffs' premises which faced Wendron-street were opposite to, or in any way affected by, their new building. They alleged that the new building was erected the width of Wendron-street at that point, was only at its narrowest part 19 ft. 2 in., and that the new building had been set back 2 ft. 3 in., thereby making the present width of Wendron-street at that point 21 ft. 5 in. The defendants also pleaded that the wall of the old building was only 20 ft. 6 in. in height, and that the new building was finished as regarded elevation, and although the height of the wall of the new building exceeded that of the old by 3 ft. 6 in., the new buildings were set back 2 ft. 3 in. The defendants also alleged that the plaintiffs were informed two months or more before the commencement of the action that 29 ft., the height of the wall of their new building, as originally proposed, had been reduced by them to 24 ft. They also denied that the new building in any way interfered with the access of light to any windows in the plaintiffs' premises. There was also a further plea that detached plans of the new building had been submitted to and fully approved by Richard Cotton, the husband of the plaintiff, Martha Cotton, for and before the completion of the purchase of the site.

Mr. Chadwyck Healy, Q.C., and Mr. Warrington appeared as counsel for the plaintiffs, and Mr. Neville, Q.C., and Mr. Aldred W. Rowden represented the defendants.

After Mr. Chadwyck Healy had opened the plaintiff's case, his Lordship asked whether there was any dispute about the lights being ancient, Mr. Neville replying that there was as to at least two of them.

Mr. James Julian, a builder and surveyor, carrying on business at Truro, in answer to Mr. Healy said that he had known the plaintiff's premises for the last fifteen years. In 1884 he was engaged on some

alterations on the property, and prepared the plan put in. The ground-floor contained a shop and office, and the first floor show and sale-rooms. There was always a difficulty about the light there, and in 1884, when he made some alterations to the premises, he arranged to put another window in by the side of the door. Since the bank had been erected, on the other side of the street, he had noticed a serious difference in the light. The original light enjoyed in the basement was at an angle of 45 deg., and it was now at an angle of 30 deg., thereby showing a diminution of 5 deg. Formerly the sky could be seen from the basement window, but on account of the increase in height of the new building it could not be seen now. There was only one window to the office, the light originally entering at an angle of 34½ deg. It now entered it at an angle of 22 deg. The light originally entered the first floor windows at an angle of 17 deg., and it now entered it at an angle of 31 deg., showing a diminution of 14 deg. The light, in his opinion, was very seriously diminished. He considered that the damage done to the owner of the premises could not be estimated at less than 20s. a year at a twelve years' purchase. That was the estimate on the existing lease, viz., 240s. Then there were twelve years further to run after that lease had expired, and he estimated that at another 240s., making 480s. in all. The damage done to the business carried on there was much more difficult to estimate, but considering the nature of the business, he should put it at between 400s. and 500s.

Cross-examined: He was a builder and surveyor, but not an architect. It was not the first angle of light that he had taken by a long way. He had given evidence with regard to light in three or four cases. He gave evidence a short time ago down in Penzance in a case before the Official Referee. He had not been employed on the premises since 1884.

Mr. James Hicks, of Redruth, architect; Mr. Eva, Helston, builder and surveyor; Mr. H. Oates, a warehouseman, formerly apprenticed to Messrs. Read & Roberts, Mr. Richard Cotton and Mrs. Martha Cotton, one of the plaintiffs, having given evidence to the effect that the access of light to the windows had materially diminished since the erection of the new bank, the plaintiffs' case closed.

The first witness called by the defendants was William John Green, who said that he was a builder at Helston, and was employed by the defendants in the erection of their new building. In erecting the new building they drew back the line of frontage 2 ft. 3 in. at the higher end and at the lower end 3 ft. 6 in. There was a mesne retirement of about 3 ft. He knew the plaintiffs' premises before the alterations of 1884. The windows in the plaintiffs' premises facing Wendron-street on the first floor, according to his recollection, were two, and a dummy window. He had some knowledge of the nature of the basement window. Most of the window was under the pavement level. The lighting area was so small that very little light could get through under any circumstances. He should not like to say that the plaintiffs' building was in no way affected by the building opposite, but it was so small as to make, in his opinion, no appreciable difference whatever.

Cross-examined: The reason he called the window on the first floor a dummy was because the light was blocked. He did not know whether there was any glass in it, as he had never seen it from the inside.

Mrs. Jane Day, of Helston, formerly an assistant to Read & Roberts, gave evidence as to the room on the first floor and the plaintiffs' premises being lighted by the two windows facing Menage-street.

William Charles, a mason, living at Helston, said that in January, 1885, he remembered doing a job for Mrs. Cotton on the first floor of the shop. He opened a window. He worked from the inside, and had to knock through the plaster. There was not a window there before as far as he was aware.

Mr. Silvanus Trevellick said that he was a Fellow of the Royal Institute of British Architects and a County Councillor for Cornwall. He had been twenty-three years in practice as an architect and thirteen of that period in the city of Truro. He had had considerable experience in questions of light and air and when called upon to design a building always made a careful survey of the surroundings with a view to a proper consideration of such matters in planning. This was most carefully done in connexion with the designing of the new bank building for the defendants. He prepared a site plan showing the relative positions of the properties and a sectional plan showing the relative heights at the points marked on the site plan. He had inspected the whole of the plaintiffs' premises on July 15 last and found the light on every floor sufficient for the most minute observations. He had tested shades of black and brown in different parts of the show rooms and found not the smallest ground for saying that the light was lacking in quantity.

Mr. Anson said he practised at 72, Laurence Pountney Hill, and was a Fellow of the Institute of British Architects and a Fellow of the Institute of Surveyors. He had had great experience in questions of light. He had been given measurements of the old buildings and the new, and he had taken

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Deadlines to be delivered.
Promenade, Sea-wall, &c. North Shore.	Blackpool Corporation	3000 100, 500.	Jan. 25
Asylum for Lunatics, &c.	Lancashire Asylum Bd.	2000, 1500, and 1000.	No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Making-up Chestnut road, Catford	Lewisham Rd. of Wks.	Official	Nov. 14
*Shore, Highgate, Kendal	do.	do.	do.
Combing Shed, &c. Tong, near Bradford.	Braithwaite & Co. Ltd.	Stephen Shaw	do.
Y-ike	do.	T. Barker	do.
Alterations to Workhouse.	Norwich Union	J. B. Pearce	do.
Footbridge, Cardiff, Monmouth, and Llandarum	G. W. R. Co.	Official	do.
Steel Rails, &c.	do.	do.	Nov. 16
Bay and Store, Derby	M. R. Co.	do.	do.
*Mess Room, Office, &c. Wellington	do.	J. E. Wilson	do.
Pipe Sews (500 yards), Coventry	do.	do.	do.
Three Shops, Manchester-road, Bradford	do.	do.	do.
Yardston, &c. School Buildings	Leamington Sch. Bd.	F. Foster	Nov. 18
Alterations, &c. to Farm Buildings, Hazon, Akington	W. E. Lawson	G. Emvell, Junr.	do.
Iron Water Main, &c. Melbourne, Derbyshire	Shadlow F.S.A.	Official	do.
*Supply of York Paving	Barnesbury Vestry	do.	Nov. 20
Reservoir, Pipe Laying, &c. Hurlford	Ayr County Council	Jas. Wilson	do.
Road Works, Kerling, &c. Portsmouth	Portes. Bd. Bd.	Stephen Shaw	Nov. 21
Stables, Simpson's County Mews, Kendal	A. H. Simpson	do.	do.
Electric Light, Buildings	Newport (Mon.) Corp.	Newman & Jacques	do.
*Gas Engineering and Fittings to Schools.	West Ham Sch. Bd.	do.	do.
*Grants or Quizzes	Gay's Thruicks Loc. Bd.	Official	Nov. 22
Re-building Bridge, Broomfield	East County Council	do.	Nov. 23
Road Works, Ashford, &c.	Hornfield Loc. Bd.	A. P. L. Cotterell	Nov. 24
Pipe Laying	Helemburgh Police Commissioners	Jas. Wilson	Nov. 25
Granite Kerb and Tiles	Clester Moor (Cm.) Local Board	Official	do.
*Two Lancashire Boilers	Leicester Corporation	J. B. Everard	do.

CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Farm Building, Sandford	Oxford Corporation	W. H. White	Nov. 27
Houseware and Iron Sews, &c.	Newbury Town Comm.	Jos. Anstie	do.
*General Paving Works and Materials	Whitechapel Bd. of W.	Official	do.
Branch Railway (3 miles), Bromyard	O. W. R. Co.	Wm. Clarke	Nov. 28
Kitchenware Pipe Sewer	Jarrow Town Improvement Committee	J. Petree	Nov. 30
*Sewerage Works.	Rivernall Comm.	Official	do.
School Buildings, Brynamman, Wales	School Board.	do.	Dec. 4
Sewerage Works.	Solihull R. S. A.	W. H. Radford	do.
Sewerage and Surface Drainage, near Liverpool	Walton-on-the-Hill Local Board	S. Middlebrook	Dec. 8
*Park, Royal Pier	Southampton Harbour Board	R. C. Poole	Dec. 11
*Addition to Infirmary	Royal Infirmary, O. N. R. Co. Ireland	W. H. Mills	Dec. 30
Branch Railway (3 miles), Ardee	do.	do.	do.
Repairs, &c. "Palmerston," Wall-street	do.	do.	do.
Cottage, Llandilo, Arranmore, County Londonderry	Thos. Betton	do.	do.
Farm House, Stables, &c. Heya Farm, Llanymyneir, Blackburn	Jas. Aspinall	do.	do.
Kerling, Channelling, &c. Leek, Lancashire	J. R. Russell	do.	do.
Large Store, Larne, Ireland	Rd. Carson	do.	do.
Two House, Neath Abbey, Wales	W. D. Rees & Co.	do.	do.
Gas Main 400 yards, &c.	Bulth Gasworks	S. G. Tulk	do.
Excavating (1,800 cubic yards), &c.	do.	do.	do.
Sewerage on Tyne	do.	do.	do.
Excavating (7,000 yards), &c. near St. Albans	do.	do.	do.
*Detailed "Farmal" Officers' Quarters	War Department	Official	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be made.
*Engineering Draughtsman	Birkenhead Corp.	100l.	Nov. 22
*Sanitary Inspector	Poplar Bd. of Wks.	150l.	Nov. 23
*Surveyor	Orphan Working Sch.	do.	Nov. 28

Those marked with an Asterisk (*) are advertised in this number. Competition, p. iv. Contracts, pp. iv, vi, and viii. Public Appointments, pp. xx and xxi.

measurements of his own upon the model. In his opinion the lights of the plaintiffs' building were not materially injured, and the premises were not worth a farthing less either to let or to sell.

Mr. E. R. Robson, of Bridge-street, Westminster, and a Fellow of the Institute of British Architects and also of the Institute of Surveyors, said that he had had a very large experience in questions concerning ancient lights. He had checked the calculations of Mr. l'Anson, and had found them correct.

His Lordship, in giving judgment, said that he could not say, having heard the evidence, that there had been no injury to the plaintiffs' lights, and he thought that the injury was one which the Courts ought not to neglect. He did not think that the Court was entitled to say the injury was so small that it should be disregarded. On the other hand, he was satisfied that the plaintiffs' account of the damage had been greatly exaggerated. The damage he should award to the plaintiffs would be 50l., but he should direct the taxing-master to bear in mind the amount recovered, and subject to that direction he gave the plaintiffs the costs of the action.

MEETINGS.

FRIDAY, NOVEMBER 10.

Architectural Association.—Mr. A. Beresford Pitt on "How to Study Design"—an introduction to the course of lectures on "Beautiful and Practical Design." 7.30 p.m.

Junior Engineering Society.—Presidential Address by Mr. J. Wolfe Barry. 8 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Mr. J. F. J. Sykes on "General Powers and Duties of Inspectors of Nuisances." 8 p.m.

SATURDAY, NOVEMBER 11.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Visit to the East London Waterworks. Lea Bridge, at 1.30 p.m.; and Leyton Sewage Works, at 3 p.m.

MONDAY, NOVEMBER 13.

Surveyors' Institution.—Address by the President, Mr. Charles J. Shoppee. 8 p.m.

London Institution.—Sir Robert S. Ball on "Recent Researches on the Sun." 5 p.m.

University College.—Lectures on Chaldean and Assyrian Archaeology, by Mr. W. St. Chad Boswell: IV. "Chaldean Sculpture." 5 p.m.

Clerks of Works' Association (Carpenters' Hall).—Paper by Mr. J. D. Sutcliffe. 8 p.m.

TUESDAY, NOVEMBER 14.

Institution of Civil Engineers.—(i) Address by the President, Mr. Alfred Giles. (ii) Presentation of Medals, Premiums, and Prizes awarded at the close of last Session. 8 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Mr. J. F. J. Sykes on "Objects and Methods of Inspection." 8 p.m.

WEDNESDAY, NOVEMBER 15.

Carpenters' Company.—Lectures on Building and Sanitary Construction. VI. Mr. H. Law on "Principles of Calculating Areas, Cubic Space, &c.; Interpretation of Plans and Sections to Scale." 8 p.m.

British Archaeological Association.—Mr. H. Syer Cuming, F.S.A. (Scot.), on (i) "The Parish Church of Leeds, Kent"; (ii) "Merchants' Marks." 8 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Visit of Inspection in the Parish of Chelsea. 2 p.m.

Royal Meteorological Society.—(i) Mr. F. J. Brodie on "The Great Drought of 1879, its Atmospheric and Meteorological Phenomena." (ii) Paper by Mr. W. Marriott. 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting of the Members. 8.30 p.m.

Society of Arts.—Opening Address of the 140th Session by Sir Richard E. Webster, Q.C., M.P., Chairman of the Council. 8 p.m.

THURSDAY, NOVEMBER 16.

Arts and Crafts Exhibition.—Mr. Selwyn Image on "The Value of a Catholic Spirit in Art." 8.30 p.m.

University College.—Lectures on Greek Sculpture: Pheidias to Lysippos, by Professor Percy Gardner. 5 p.m.

Sanitary Institute (Lectures on the Sanitation of Industries and Occupations).—Dr. T. Arledge on "Mineral (Non-Metallic) Dusts, the Manufacture of Pottery, &c." 8 p.m.

Dundee Institute of Architecture.—Conversations, to be held in the Victoria Art Galleries.

FRIDAY, NOVEMBER 17.

Institution of Civil Engineers (Students' Meeting).—Messrs. James and Richard Goodman on "The Filtration of Potable Water." 7.30 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Dr. A. Newsholme on "Nature of Nuisances, including Nuisances the Abatement of which is difficult." 8 p.m.

SATURDAY, NOVEMBER 18.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Visit to Friern Barnet Sewage Works. 3 p.m.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

21,747.—**DRAUGHT EXCLUDERS:** J. Holgate.—According to the invention, hinged plates are attached to the top and sides of the door or window. Mechanism is attached at one side of the frame, which presses the plate against the side of the door. At the bottom of the door is fixed a plate, which is raised automatically by means of an incline or projection, and latched in position by a catch. When the

door is opened, the catch comes in contact with a projection, and is thereby disengaged, allowing the bottom plate to rest on the floor.

21,841.—**FIREPROOF BUILDING:** J. Ferguson.—This invention consists of a combination of burned fireclay, or other suitable materials, making hollow cores or tubes fixed in concrete, laid in a plastic or soft condition on the top of these cores or tubes.

23,743.—**SASH-FASTENER:** C. Henderson.—A hollow cylindrical metal casting is attached to the outer sash. To this casting a flange is affixed to take in the threaded screw of a rotating bolt, turned in from another casting which is fixed on the inner sash.

23,871.—**GLAZING:** A. E. Rendle.—This patent relates to an improvement on a well-known system of glazing, consisting mainly of a series of inclined troughs or astragals and a series of cross troughs arranged to connect and support the glass at their edges and to receive and carry off all the water accumulating upon the panes.

25,841.—**WASH-OUT CLOSET:** T. W. Twyford.—The invention consists in choking or contracting the mouth entrance to the trap in such a way that syphonic action is obtained in the said trap, and as a partial vacuum is obtained the removal of soil and accumulations is effected and complete.

8,806.—**TOMBSTONES, &c.:** J. Cannadine.—The memorial stones which are the subject of this patent are made in clay, baked, enameled, or glazed; or in Parian or other cement, and the lettering or any device required is raised or sunk so as to be solid with the rest of the structure.

13,006.—**VENTILATION:** P. Lomax.—Atmospheric air is supplied by pipes much in the same way that gas is conveyed through pipes. The supply of air is kept up by means of a Root's fan, and the current can be turned on or off as may be required.

15,036.—**DISINFECTING:** F. A. Black.—This invention consists of an automatic apparatus for purifying sewer drains, cesspools, &c., by disinfesting liquid slops delivered and controlled by the action of water dropping and the regulated admission of air.

16,711.—**DOOR FURNITURE:** J. H. Starling.—The employment for door furniture of celluloid, vulcanite, or such substances, in lieu of earthenware, metal, or wood is commonly used.

NEW APPLICATIONS FOR LETTERS PATENT.

OCTOBER 23.—19,888, T. White and G. Phillips, Windsor Sashes and Frames. 19,921, H. Dickinson, Time Apparatus for Automatically Switching Gas and Electric Light.

19,939, A. Mack, Composite Boards or Slabs for Building Purposes. 19,961, S. Royle, Packing Cases.

OCTOBER 24.—19,969, A. Brookes, Finishing or Polishing the Surface of Wood, &c.—19,979, H. Jennings, Radiators. 19,998, R. Lethbridge, Ventilating Buildings, and Heating, Cooling, and Moistening the Air contained therein.

20,008, M. Adams, Baths, Lavatory Basins, &c.—20,010, H. Deffries, Automatic Indicator for Lavatory and other Doors.—20,056, R. Harry, Window Silencers, &c.

20,068, R. Harry, Window Silencers, &c.—20,079, Lake, Wood-cutting Machines.

OCTOBER 25.—20,080, P. O'Connor, Heating and Ventilating Buildings or Structures.—20,096, J. Adams, Window Silencers.—20,126, W. Bull, Brick Lining.

20,147, A. Blake, Stop for Windows.

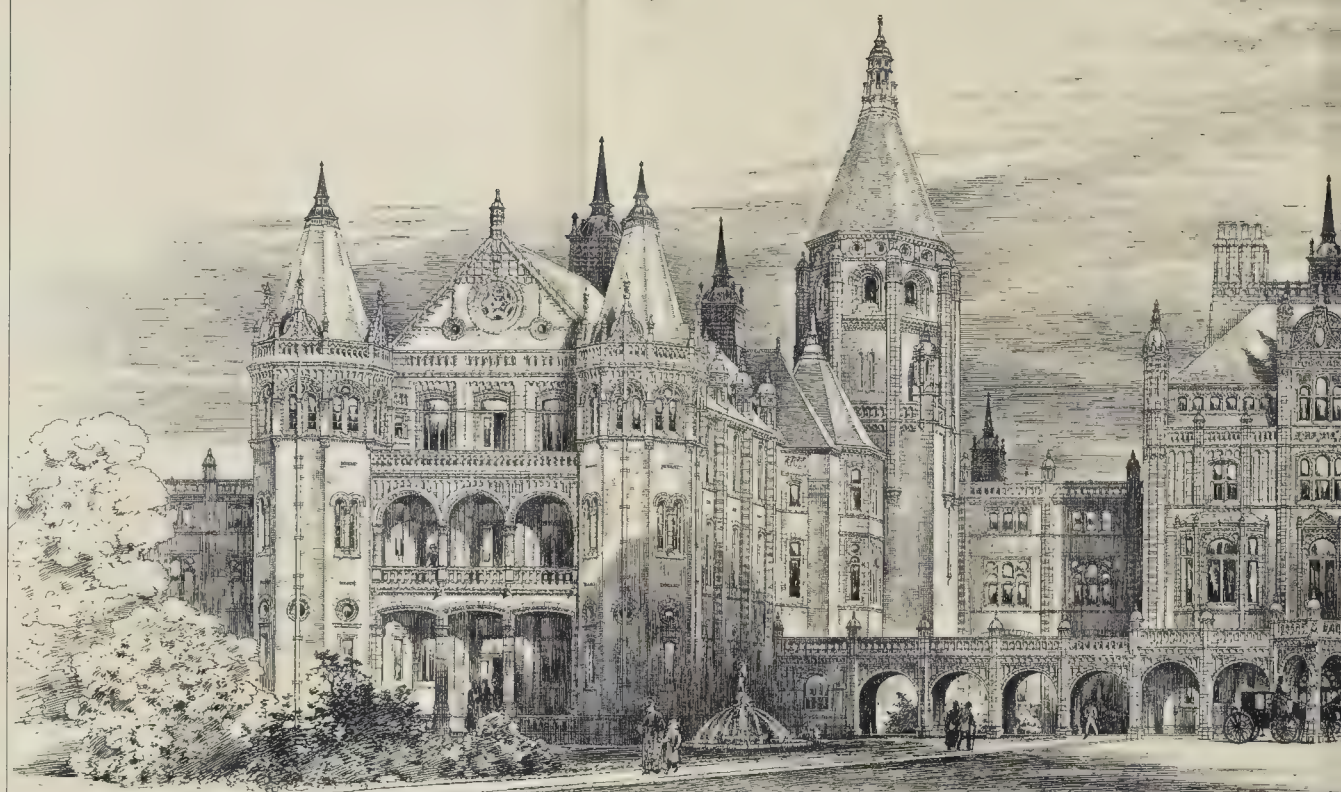
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VOL. LXV. NO. 269.

NOVEMBER 16, 1895.

ILLUSTRATIONS.

New General Hospital, Birmingham.—Mr. W. Henman, A.R.I.B.A., Architect	<i>Extra Large Photo-Litho.</i>
Plans of New General Hospital, Birmingham.—Mr. W. Henman, Architect	<i>Two Single-Page Photo-Litho's.</i>
Elevation of Staircase in North Transept of Burgos Cathedral. Drawn by Mr. A. N. Prentice, A.R.I.B.A.	<i>Double-Page Photo-Litho.</i>
Façade of Convent of St. Marcos, Leon, Spain.—Drawn by Mr. A. N. Prentice	<i>Double-Page Ink-Photo.</i>

Blocks in Text.

Old Doorway, Carey-street, Lincoln's Inn	PP. 378, 379	Diagram Illustrating Article on "Geology" (Student's Column).....	p. 378
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The Plateresque Architecture of Spain.



It is not so long since the early Renaissance architecture of Spain was regarded by architects and art-critics (so far as it was regarded at all) as a chapter of 'eccentricities,' not worth serious

attention in comparison with the more sober, restrained, and classic forms of Italian and French Renaissance architecture. The very name given to it by the Spaniards themselves, the "Plateresco" or "silversmith's" style, seemed to convey an imputation against 'it as a type of architecture wanting in breadth and dignity, and with details more suitable to furniture or metal-work than to building. In the late David Roberts's book of rather superficial and mannered architectural sketches in Spain, accordingly, we find only two examples of the Early Renaissance style of the country illustrated throughout the volume, the bridge at Toledo and the tombs of Ferdinand and Isabella at Granada. Roberts painted a picture, one of his most ambitious efforts, of the Burgos Cathedral staircase, though (as remarked elsewhere) he succeeded here in creating a pictorial effect rather than an architectural representation, and for the sake of effect exaggerated some of the details which did not in themselves require any exaggeration. But generally speaking Roberts devoted himself more to the Moorish types among Spanish monuments. The full Renaissance style which succeeded the Plateresque—the style of which Herrera was the great name—is the coldest and the least interesting of all the types of formal revival of Roman architecture in the fully developed Renaissance period, and has not interested either architects or artists very much, while the extravagances of the succeeding phase of debased Renaissance (if it may be called so), known as the Churrigueresque, are perhaps, if not so dull, still less attractive to a well-regulated architectural perception. Consequently it has come to pass that Spanish Renaissance has been greatly neglected by architectural students and illustrators, the early and late styles because in the eyes of the

purist they are licentious and illegal developments, the middle or pure Renaissance period because it has not the grace and refinement of Italian work. The chief efforts of architectural illustrators in Spain have been directed to the Moorish work there, about the interest and beauty of which there has been always a common consent, and the magic of the Alhambra has thrown everything else into a secondary position; and, as Fergusson complains, among the hundreds of artists who go into ecstasies and write books about the Alhambra, not one has ever condescended to look at the remarkable early Renaissance Cathedral of Granada close to it. Thirty years ago Street saw the interest of studying and illustrating the special features presented by Gothic architecture in Spain, though his single volume, with its carefully-executed but small woodcut illustrations, leaves plenty of scope for other illustrators in the same field.

Nevertheless, Street took the lead in illustrating and calling attention to the Spanish phase of Gothic architecture, and the Moorish architecture of Spain has been amply illustrated, though not more so than it deserved. On the whole, therefore, there could hardly have been a better choice for any young architect wishing to distinguish himself in the production of a new and important illustrative work than the Spanish Plateresque style of the early half of the sixteenth century, which presents so much for the draughtsman, and which has certainly not been adequately illustrated in any publication that we know of. The Plateresque may be considered to be to Spain what the Francis I. style is to France: nearly contemporaneous, each represents what could be made out of classic forms of architecture when first taken up in a country from which the Mediæval tradition or feeling had scarcely died out. In each case we find an architecture in which the leading forms of classic style are treated with a picturesque freedom characteristic of Mediæval art, and accompanied by details which are more or less distinctly of Mediæval type. But the French form is far more severe and restrained than the Spanish, and is purer and more dignified in expression. It recalls Mediæval architecture chiefly in its varied and multitudinous skyline, in the forest of turrets and chimneys which rise above the roofs of such an edifice as Chambord, of which the nearest analogous type in English

architecture is to be found in Burleigh House, or in some of the Scottish castles. The high-pointed roofs, too, of the French château retain the Gothic feeling for verticality of expression. In the Spanish Plateresque style we do not find this tendency to high roofs, but on the other hand we find a richness and exuberance of decorative detail which is more than Mediæval; it is the Mediæval spirit inspired by reminiscences of Oriental art. This is what makes the special interest of the Plateresque architecture. Here, and here alone, we see how it is possible to combine general forms based on classic architecture with something of the rich effect of Oriental detail. The Renaissance is there, but the influence of Moorish art is on it, and this is what gives the special and unique interest to the style of architecture illustrated in Mr. Prentice's fine volume of drawings. It was probably the monuments of this school of Spanish architecture more than any other which prompted the remark of Sir Digby Wyatt, in "An Architect's Notebook in Spain," that the most prominent impression produced upon him by his first contemplation of Spanish architecture on its own soil was that of its entire indifference to expense. It was a pity that, perceiving this as he did, he should have been content to accompany his literary notes thereupon by such absurdly inadequate sketches.

Mr. Prentice has taken the opposite course. Content with very brief literary and historical notes, he has given his main attention to the production of a set of admirable and elaborate drawings, and has thus for the first time brought home to those who have not visited Spain for themselves something like an adequate idea of the richness and interest of her Early Renaissance Architecture.

A great deal of the characteristic effect of this fascinating school of architecture consists in the massing of ornament and detail at certain points, contrasted with large expanses of plain wall space; in itself a distinctly Oriental characteristic. In the very first plate, the view of the library of Santiago Cathedral, we notice the striking effect of this contrast. The ground story consists of a very plain arcade; the middle story of pedimented and grated windows inserted at intervals (not quite regular) in a surface of plain wall; the upper story of a long row of arched windows with deep reveals, divided by pilasters which (accord-

ing to the drawing) are panelled not in the shallow manner of Italian Renaissance, but with deeply-recessed panels giving a dark point of shadow at the top. Over the cornice is the most Oriental characteristic of all, a parapet, or rather an upright fringe, of rich and elaborate pierced ornament, with upright colonnettes rising above the general line of the design. The Hospital des los Reyes at Santiago (plate 2) is still more Oriental in character. The main design consists of windows inserted in blank walls, with some ornamental framing around them which is partially Renaissance in form; the whole richness of the design being concentrated around and above the central doorway, where a kind of reredos seems planted against the wall, made up of a profusion of sculptured pilasters, niches and sculpture, and in the abnormally deep and highly enriched cornice which crowns the whole building. This cornice, according to classical canons, is quite out of proportion to the height of the wall which it crowns, yet it seems in keeping with the whole. The façade of the palace at Cogolludo on the same page is even more striking in its contrast of enrichment with plain walling; a whole mass of severely rusticated wall is broken on the ground story only by the one enriched doorway in the centre, and on the upper story by six windows inserted in the wall at equal distances; a similar immense cornice over the whole. There is something in the general appearance of this which rather reminds one of the Riccardi palace, though with a difference.

The special treatment of details which are more distinctly classical in character is illustrated in the interesting and elegant colonnade of the courtyard of the Casa Miranda at Burgos (plate 11), which the author calls a typical specimen of a Spanish nobleman's town house, though now in a very dilapidated condition. Here we have a double-storied colonnade, the lower colonnade supporting a gallery on which is the smaller-scale upper colonnade with a low screen wall between the columns. The columns in both stories are treated with the shaft plain below and fluted above, with a projecting moulding below the fluting; the interesting detail is the capital, which is a very well-designed and classic-looking bracket capital, combined with a portion of the usual hollow-lined abacus in the centre. This latter seems a rather unnecessary adjunct to a bracket capital, though the two details are very cleverly fitted together; the whole design is at once bold and graceful. In the elevation of the *patio* (the central courtyard) of another mansion, the Casa Polentina at Avila (plate 19), we have the same arrangement of the double-story colonnade, in this case with plain columns of a rather crude Roman-Doric type, their bases set on low square pedestals, and the capital carrying square blocks from the side of which spring the brackets.

The Monterey Palace at Salamanca is another striking example of the effect of grouping and concentration, the main portion of the walls being as bare as those of a prison, and with irregularly spaced totally plain window openings; the upper story contrasts this with a symmetrical row of circular-headed windows with pilasters between, and a rich balustrade over. This concentration of ornament in one part is indeed a leading feature of the style. It gives very marked character and picturesqueness, but a sober judgment must conclude that it is not the most reasonable or truthful method of treating the exterior architecture of an important building, unless there is some very decided reason, in the use or construction of the building, for thus emphasising a particular story. In the case of the Monterey Palace the upper arcade forms an open loggia, and Mr. Prentice suggests that the use of this was for the ladies of the palace to take the air in at times when the streets were not safe for them, which probably happened often enough. But this does not

explain the similar treatment in the cathedral library façade of Santiago, already referred to, where the upper story arcade consists of windows; unless indeed the openings have been glazed in later times.

The façade of the Alcazar at Toledo is in a much more classic style, the windows regularly spaced and framed between pilasters and a cornice, in much more Italian fashion than in many of the other buildings illustrated; though here we have the curious anomaly that the upper story (there are three in all), more lightly treated in most of its details than the lower ones, has the surface of its wall worked in a heavily-jointed rustication, while the two lower stories are of plain masonry. The effect, as may be supposed, is anything but good, and looks like a perverse inversion of the natural order of things, which should lead the architect to give the greater appearance of strength and emphasis to the lower portion of the wall surface, if to any.

The architectural designs of the various *patios*, two of which we have referred to, are among the most interesting and finest pieces of work illustrated. The bracket capital meets us again in very varied forms, and the treatment of the colonnades and of the gallery balustrades is in all the examples of great beauty, and these designs deserve special study, the more so as they are mostly in a more restrained and classic style than the exterior of the buildings, and may afford suggestions for novelty of treatment in detail of this kind, such as may be worked upon without giving to a design too much the appearance of Spanish work transported to English soil. In the *patio* of the Casa de la Infanta at Zaragoza we have, however, an arcade in that more richly ornamented but somewhat corrupt style of treatment which especially seems to suggest the title of "Plateresque," or at least looks either like silver work magnified or like terra-cotta work. The similarity of this work to the silversmith's work of the period is indeed strikingly illustrated by the sketch of the beautiful "Custodia" from the monastery of Silos, prefixed to the index of plates, perhaps as a kind of practical illustration of the special title given to the style of architecture illustrated.

In a great deal of the ornament illustrated in this book we see the exuberance of Spanish artistic taste (acted on as it had been by Moorish influence) exemplified in the extravagant fancy and superabundance of detail into which it runs. The kind of grotesque fancies peculiar to Renaissance ornament seem here to run riot. Another peculiarity is the tendency to the use of very large scroll ornament. The most striking example of this is at the foot of the Burgos staircase (see lithograph), where the scroll, seen endways in outline, looks bold enough, but when we come round to the side we find it is nearly 10 ft. long. This is one of the features which most strikes the eye in the design of this staircase, and though it is a disproportionate and semi-barbaric detail, one cannot deny that there is a stroke of decorative genius in it.

We are glad to see that Mr. Prentice has given several examples of the splendid iron screens of Spain, which have a special character of design not to be met with elsewhere; the combination of simple vertical railing, slightly relieved by ornament and shapeliness of outline, with exceedingly rich and florid foliated ornament in the upper portion. This is the same contrast of plainness with richness which we notice in the architecture. The portion of the screens which acts mainly as a barrier is treated with practical severity; the rich decoration is introduced as a crown to the work. The details of the standards of the railing at Cuenca Cathedral (Plate 34), which are given to a large scale, are very refined, and worth the attention of artists in wrought iron.

We congratulate the author on the successful production of a work which has cost much time and labour, and which is an important addition to architectural illustration.

THE DEBATE ON THE EMPLOYERS' LIABILITY BILL.

AS most of our readers have already seen, the Government defeated Mr. Walter Maclaren's new clause by a majority of nineteen, and by this number therefore the doctrine that a workman may not contract himself out of the Act has been affirmed. Mr. Maclaren's clause only applied to existing mutual insurance societies to which employers subscribed, and as such it was undoubtedly open to the criticism of the Home Secretary that its author had not the courage of his opinions, otherwise he would have made it applicable to future agreements between employers and employed as much as to those that are already in existence. We regret that Mr. Maclaren did not do so, because we have no hesitation in repeating what we have already on previous occasions said, that under proper safeguards it is better for all concerned that employers and employed should make an amicable and standing agreement by which workmen may be compensated in cases of accident or illness at a specified and known rate, and without recourse to litigation. It is said, as one argument against such mutual arrangement, that the workman, if he is injured, may obtain under the Act a larger sum than he will get from the society to which he and his employer alike contribute. That may be so, but if he gets less he gets it without expense and without delay; he gets it whether he has a good or a bad case; whether he has by his negligence contributed to the accident, or whether he has not. It is obvious, therefore, that even if he gets something less if he is injured without negligence than after a recourse to law, he has substantial advantages to balance such diminution. The employer who gives 20 per cent. discount to his customers if he receives cash for his goods obtains less in actual money than if he waited to be paid, but he obtains a substantial advantage by so doing. The same theory applies to the workman who gives up an uncertain for a certain advantage. In truth, the more the case against the liberty to contract out of the Act is examined, the weaker does it appear. It was said that workmen were not free agents in regard to contracting out of the Act, and that they were, in some way or other, forced to do so as a part of the term of their contract. But they are no more forced or compelled to contract out than they are forced to take a particular rate of wages. And if the workman is not strong enough to take care of himself in regard to contracting out, it is obvious that he is not strong enough to protect himself in regard to the sum he should be paid for his labour. But no one for a moment doubts that he is well able to take care of himself in this respect. Again, even assuming that what may be called pressure is placed on the workman to contract out of the Act—in other words, that he will not be employed, or will not be employed at the same rate of wages, if he does not contract out—and that, if he were an absolutely free agent, he would prefer to take his chance in case of an accident, what is this but pressure which he suffers in other forms from fellow workmen? In the case of joining a union a workman is under constant pressure; if a strike is carried by a majority, a minority dare not resist. If the workman is to be protected by the Legislature in regard to his transactions with his employer, should he not also be protected in transactions with his fellow workmen? In truth, the opposition by the Government and most of its supporters to Mr. Maclaren's clause was based not on a genuine belief in the virtue of the Bill as it stood, but because the Trades Unions had made up their minds that the contracting-out clause would weaken their hold on large bodies of workmen, and would lessen their power to produce strikes. The Trades Unions influence a larger body of votes than the free workmen, and hence a larger body of members voted against

Mr. Maclaren's clause than were found to vote for it.

One specious argument deserves some notice: it is said that the primary object of the Act is to prevent accidents, not to compensate the workman, and that this object will be defeated if the workman is allowed to contract himself out of the Act. For, it is argued, he will be less careful when he belongs to a mutual society, knowing that, negligent or not, he will obtain compensation from the society: on the other hand, the employer, having always to pay the same annual sum, will also be less careful in regard to machinery and management than if he were liable to pay damages whenever a workman is injured. But it is childish to suppose that when a workman is engaged on his work he will think whether or not he is going to get compensation from his society; he will be just as careless whether he is to be compensated by his employer or by his society. So far as the employer is concerned it is obvious that when his risks are greater his charges to the general public must and will be greater. If a builder may have to compensate his workmen to an unknown extent over a job, he will add to his charges a sum which, taking one job with another, will repay him for his extra risks. If, on the other hand, his workmen and he contributed to a mutual insurance society, he can work out to a nicety the amount which he requires to obtain from the person by whom he is in his turn employed.

Mr. Burns quoted various statistics to prove that contracting out increases accidents, but they were altogether untrustworthy. To say that because there is full liberty to belong to mutual insurance societies in Germany, and because the number of accidents is greater than in England, that therefore the insurance system produces greater carelessness on the part of employer and employed, is simply using certain statistics to serve a purpose without regard to other causes which may be at work. The state of the law in regard to the inspection of manufactories, and many other causes, may be and are at work to produce accidents. In truth, statistics without proper investigation and comparison are the most deceptive of things, and may be employed to bolster up the worst of causes. Again, also, what might possibly be true in the case of individuals is not true in the case of great corporations and great commercial firms (to whom the amendment applied), whose working is watched by a competent and keen body of men, quite alive to risks which they undertake. We repeat that the main motive of the hostility of the trades union leaders to Mr. Maclaren's clause has been their dislike to a system which places employer and employed on a footing of common interest. They wish to increase the power of the unions, and the numbers of the members of the trade societies. They forget that the closer capital and labour are connected, and the more amicable are their relations, the easier is the battle of competition, and the more peaceful and contented are the workmen.

But the matter is not yet settled; it is regarded as certain in well-informed circles that Mr. Maclaren's clause will be inserted by the House of Lords, and there will then arise a fresh discussion in the House of Commons, namely, whether the Lords' amendment shall or shall not be agreed to. Two courses will be open to the Government, either to agree to let the Bill so amended pass into law, or to drop it altogether. The latter would be a very dog-in-the-manger policy and unworthy of true statesmen, since the other benefits to the working classes, such as the abolition of the doctrine of common employment, which are in the Bill, would thereby be lost. But we should not be surprised if this course were adopted for purely party purposes, and in order to get up a cry against the House of Lords and against the opposition among the trades unions. But a few weeks will set the question at rest.

Meanwhile the House of Commons has inserted during the debates of the present week two new clauses of exceptional interest. The first of these gives the workman a right of action against the principal contractor when the latter has sub-let part of the work to a sub-contractor, although as a set-off the principal contractor is to have a right of indemnity against the sub-contractor. As the whole doctrine of the liability of the employer to compensate a workman for injuries received by him is wholly artificial, there can be little objection to the extension of the doctrine so as to give the workman one central figure to sue. But probably also the terms of business will, after the passing of the Act, be so arranged between contractor and sub-contractor that the latter will have to agree to indemnify the principal contractor should the latter be sued. The sub-contractor will then protect himself either by insuring against these risks or by habitually charging a rate which shall in effect make him his own insurer. The ultimate loss will—as it nearly always does—fall on the person who is to pay for the work done; in common parlance, on the general public or the consumer. The other new clause to which attention should be directed is one making an employer liable to his workmen if the latter are either disabled or killed by the neglect of reasonable precaution, in regard to all employments in which the risk of injury to health can be mitigated by such precautions. Obviously there is a good deal of sense in this clause, as it is easy to conceive employments which are healthy in a proper state of ventilation, and unhealthy under other circumstances. The clause will apply to such cases, but if a claim is disputed in such a case it is equally clear that there may arise very troublesome and expensive litigation. Such cases are also met by the provisions of the Factory Acts; so that, in a word, this new section appears to add to the possibility of a penalty under the Factory Acts, the further possibility of an action at law and subsequent damages.

NOTES.

THE Government have at length intervened in the coal dispute, and at their next conference, which is arranged for to-day (Friday), the belligerents will have the advantage not only of an independent and impartial, and a thoroughly capable chairman, and one not at all new to the work of presiding over the deliberations of important assemblies. Lord Rosebery may be trusted to fulfil his delicate mission with tact, and it is universally hoped that the forthcoming conference may prove more successful than the last. There certainly seems to be a more hopeful feeling all round. It would almost appear as if both sides, reviewing former proceedings, have now recognised a genuine desire for peace, underlying the apparently uncompromising rejection of the various proposals then made, and that they are now prepared to look more favourably upon any practical suggestion for resuming work. Every week there are more pits at work, and all at the old rate of wages. The situation has entirely changed since the commencement of the struggle, and although the large contractors have doubtless been hit, the restricted output means a pretty large profit for the trade generally, in which the men have clearly a right to share, seeing that the gain has been principally at their cost and that of the public. It is noticeable that those miners who have already gone in to work are ready enough now to subscribe to the doctrine they so recently repudiated—that wages should follow prices—and are demanding increased wages on the ground of advanced prices.

THE City fire of Wednesday night, which originated in a block belonging to the Crown Perfumery Company (Old Bailey), was remarkable for the rapidity with which

the buildings collapsed, the company's premises, for instance, of the several buildings destroyed being practically razed within an hour of the outbreak. The spread of fire from house to house in this case was apparently generally by way of the roofs, from which the fire literally worked *downwards* into the basements, showing us practically the advantages of certain Continental building regulations, which require the division between the top floor of a house and the roof to be of fire-resisting material. As to the way in which the fire was attacked, we can only compare it with the absurdity of a regiment of cavalry to-day charging against a square of well-equipped infantry. The usual tactics were adopted of trying to pour masses of water on to the site of the original outbreak, whilst but little protection was afforded to neighbouring property, much of which was eventually gutted. In several cases, as, for instance, in the direction of a stream into the centre of the blaze from the roof of Newgate Prison, a senseless waste of water and labour was evident, the latter being, however, yet more remarkable in the laying-out of an unnecessary number of lines of hose. Mr. Simonds' water-tower was used with much effect. An American water-tower, such as was exhibited by Mr. Hale last summer, would have been practically useless in Old Bailey.

THE lecture season at the London Institution was opened on Monday afternoon last by a lecture, delivered to an unusually crowded audience, by Sir Robert Ball, on "Recent Researches on the Sun," the main subject being the question what it was which gave the light and heat from the sun. Going through some of the earlier drawings of the sun's surface (shown by lantern), followed by photographs made more recently, Sir Robert pointed out to the audience the ocular evidence (familiar enough now), from the photographs of the spots, that it was an outer envelope which gave the light, and that the spaces seen through this envelope were, comparatively at least, dark. The lecturer credited Dr. Stoney with the original suggestion that the incandescent substance which was driven up to the outer surface of the envelope, and which must be "something very infusible," was carbon, not in a gaseous state, but reduced to exceedingly small glowing particles. Proceeding to show how this theory corresponded with and explained the observed facts (or one might rather say the calculated facts, for astronomical research is now in the region of the infinitely little), he closed by explaining how the temperature of the sun might be, probably was, constantly maintained by the acceleration of the motion of these particles by the sun's attraction; carefully drawing the distinction between "temperature" and "heat"; the sun was losing its heat, as a store, but keeping up for the present its normal temperature. Sir Robert Ball has therefore no hope to offer us of the eternal permanence of the sun, if that seems of consequence to us. There was a kind of imaginary satisfaction to the mind in the theory of the sun's stability offered to us by Siemens, which is now snatched away from us; the end may be indefinitely far off, but it seems that (as we are at present advised) it must come. Sir Robert does not undertake to fix the period. The lecture was a model one as a popular demonstration. We could not help observing, by the way, that there was a vast difference between the texture and character of the sun's surface as represented in drawings from telescopic observation, and the appearance it presented by direct photography. The drawings and photographs of the *faculae* were supposed to represent the same thing; the actual difference in the result was instructive.

WE are always interested in what Mr. Pite has to say about architecture, even when we cannot agree with him, because he thinks for himself, and regards

architecture as something more than a means of earning a living. But in his cry for originality in designing, at the Architectural Association last week, he has rather overshot the possibilities of man. He is like the metaphysical lecturer who was supposed to have "got The Absolute into a corner." We cannot corner The Absolute, in architecture more than in any other line of human study; our very perceptions are made up of the results of the perceptions of our predecessors. Let any one try to design a bit of ornament which shall be absolutely original—not traceable to anything else in art or nature for its idea; he will find it impossible. The question whether the great styles of the world should be regarded as a kind of grammar to be learned, a language to speak in, as some seem to regard them, is a different one; much may be said on both sides—perhaps more on the grammatical side (as a means of training the eye at all events) than Mr. Fite would at all admit. And when we are exhorted to follow the example of the Greeks, who used a style of their own and not an archaeological one, it may be replied that the Periclean Greeks did not invent the style of the Parthenon; the style was several centuries old, in its essentials; they only refined and perfected it in detail.

ZURICH has a new "Building Act," the purport of which has been subject to much controversy, the number of voters in favour of it being 26,366 against the 20,497 of the opposition. In the new Act the question of city extension and the laying-out of roads, &c., is treated in a most radical manner, the Municipal Authorities being vested with powers to enforce the general combination of estates, and a proportional redivision after the deduction of the road area considered necessary. They have even powers to enforce an interchange of the ground of adjoining owners if their boundary lines are not at right-angles to the frontage-line of a road, and a special paragraph goes so far as to prohibit a mortgagor from withdrawing money lent to freeholders on account of the extent of frontage, boundaries, &c., having been altered by the authorities. According to the new regulations the Municipality is to build all new roads at its own expense, and the adjoining owners only have to pay half of the cost of the footpaths, and six francs per metre of frontage for the use of the sewer. The sanitary regulations are by no means up to date, though the authorities go so far as to reserve to themselves the right of regularly cleaning all drains on private property at the owner's expense. Protective measures against fire and panic are somewhat vaguely referred to, and where data are given, such as the projection of party walls over roofs (30 cm.), the requirements seem too moderate. It may be noted that all doors to churches must open outwards, as in theatres, and that no room in a hotel may be more than 60 ft. distant from a staircase. There are no restrictions as to the architectural treatment of façades, excepting that chimney-breasts and chimneys are banished from all "fronts." A plain brick return or party wall is however strictly prohibited. Such walls must have a plaster surface of "pleasing" colour. We should like to hear a Swiss judge's definition of the word "pleasing" as used in the Act.

MUNICH is apparently at last to have the Wagner Opera House for which the unfortunate King Ludwig II. twenty-five years ago instructed Gottfried Semper to prepare plans. Though Munich already has a large Royal Opera House, its auditorium cannot hold the crowds of tourists who annually pass through the city and wish to hear the Wagnerian operas. An influential committee has taken the matter in hand and is having drawings prepared for a site at the end of the new Prince Regent-street.

Semper's beautiful pen and ink drawings which illustrated the design he prepared in 1866 for the King of Bavaria were exhibited at the Vienna Theatrical and Musical Exhibition last summer, together with a model showing the proposed building on a commanding site approached by a series of terraces. The plans showed a masterly combination of two distinct ideas which, on the one side, took form in the new Dresden Opera House he built from 1871-1878, and, on the other, were afterwards developed by Herr Brueckwald in the Bayreuth Play House, and generally credited to this artist instead of to Semper. We spoke of Semper's design for the Munich Opera House at some length in an article describing the architectural contributions to the Vienna Exhibition, where the drawings were for the first time publicly exhibited.

THE activity of the Prussian Board of Works has by no means decreased in 1892, though the amount of money expended may not have been as high as usual. The Report recently published shows that the officials had charge of over six hundred buildings or alterations during the year, about 380 of which were new works. The number of churches in course of erection was fifty-three, of which three cost over 10,000*l.* each. There were forty-three vicarages in the hands of the department, and 152 schools. Eleven new administrative structures, including the new Board of Works offices at Berlin (which cost about 25,000*l.*), were in progress, twenty-two courts of law, and six new prisons, two of which cost 12,000*l.*, and one about 25,000*l.* Buildings such as those of the new offices of the Prussian Diet are not in the hands of the department, nor are any of the numerous military or post-office buildings counted, as these are erected by the German Imperial Government. The new Imperial Houses of Parliament, the new Supreme Law Courts, and the buildings of the State railway lines are likewise not managed by the Prussian Board of Works, but by special departments under the control of the Reichstag.

A CORRESPONDENT of the *Times*, in regard to the claptrap which is now written and spoken about "a living wage," calls attention to the pay of clerks in the Works Department of the London County Council. A plant list clerk, twenty-five to thirty-five years of age, is offered twenty-five shillings a week, an entering clerk for invoices the same, a cartage and material clerk thirty-five shillings per week, and he must be from twenty-five to forty-five years of age. Every one of these men must have had a good education, must be decently dressed, and will have to pay travelling expenses to and from their homes. Yet their pay is not equal to that of the miners whom sentimental persons urge to starve in order to obtain a "living wage," when at any moment they can be paid more than is given to half the clerks in London. In truth, many of the bodies and individuals who are the first to declare that artisans are insufficiently paid, are the last to better the condition of their higher servants. There are many clerks in a contractor's office whose earnings in the year do not equal that of the bricklayers or carpenters, some of whom the moment work ceases on account of the seasons or the weather, begin to call for public aid as "unemployed."

THE Journal of the Franklin Institute for October contains some practical remarks upon anti-friction ball-bearings and their manufacture, in a paper contributed to the Institute by Mr. George F. Simonds. The author improves upon the present style of ball-bearing by the adoption of a bevel-cage bearing for light work, and a double-cage bearing as applied to heavy work. A ball-bearing to be of lasting commercial

value must be absolutely accurate. Perfect spheres are indispensable, and both the balls and bearing surfaces must needs be of a temper always uniform and reliable. The author proceeds to assert that steel (no matter by what additional distinction it may be known), which carries thirty-one hundredths of 1 per cent. of carbon or less, will not harden; but above that point it will harden, and the higher the percentage of carbon which the steel carries the harder it will harden; but the more difficult, laborious, and expensive it is to work to its required shape. Quick cooling induces warping and breaking. When extreme hardness is not required, or when an article cannot safely be dipped in water or brine for rapid cooling, it is cooled in a slow-cooling medium like oil, rendering the article tough, although less liable to fracture. To overcome these difficulties, the author recommends a double bath hardening process, by means of which the article is plunged into brine, and then instantly transferred into oil without coming in contact with the air. By this process he combines the advantages, and obviates the objections, to both the quick and slow-cooling processes, and thus secures the desired hardness without setting up unequal strains in the article, tending to distortion by rapid cooling. In the ordinary system of ball-bearings, the balls are loose, and must be handled singly. Each ball is required to sustain both the weight and end thrust, but two rows of balls can be used, one row at each end of the bearing, and adjustment is needed on account of the wearing away of the balls and bearing surfaces. In the author's bevel-cage and double-cage bearings the parts are self-adjustable. The construction is the subject of a patent.

THE Society of Antiquaries has issued to its members a large folio volume being Vol. VII., Part I., of the "Vetus Monumenta." It consists of Mr. W. H. St. John Hope's description, with five plates and other illustrations, of the opening in March, 1890, of a tomb in Canterbury Cathedral, of an Archbishop. The tomb lies beneath a window on the south side of the ambulatory, St. Thomas's, or Trinity, Chapel, and opposite Archbishop Courtenay's monument. The tomb, constructed of Purbeck marble, and containing a coffin hewn out of a block of Caen stone, with lid of Purbeck, had been considered by some to be that of Theobald, *ob.* 1161, albeit somewhat later in style; but it is now believed to be that of Hubert Walter, a famous Chancellor and Justiciar, who, consecrated Bishop of Salisbury in 1189, was advanced to Canterbury in 1193, and died in 1205. Mr. St. John Hope supports this view by a reference to the catalogue of Archbishops in the Corpus MS. 298, which sets forth that Hubert was buried—

"In ecclesiâ Christi Cantuariensis juxta feretrum Sancti Thome;"

to which record Archbishop Parker added a marginal note: "aliter sub fenestrâ in parte australi," this being the exact position of the tomb that was examined. The contents of the coffin were found to be of great interest. They included (besides the body) fragments of the prelate's robes—his amice, stole, tunic, dalmatic, and chasuble; his ring and pastoral staff; mitre of amber-coloured silk; a chalice, and patten. The buskins and jewelled sandals, all of originally green silk, are, it is stated, the only examples we yet have of that early time, and they, together with the smaller foot-gear of Bishop Waynflete, at Magdalen College, Oxford, will rank as, it is believed, the only English specimens known. The vestments and articles we mention are shown in facsimile colours in the plates. In the plan (1883) by Mr. George Smith, architect, we published on January 3, 1891, this tomb is shown as "21, Unknown," whilst "28, Abp. Hubert Walter," is marked against the wall of the south aisle of choir.

ON the 8th inst., being the festival of the "Quatuor Coronati," the Lodge of Freemasons bearing that name met at Freemasons' Hall; and Dr. W. Wynn Westcott was duly installed as Master, in succession to Professor T. Hayter Lewis, whose year of office had expired. The new Wardens are the Rev. C. J. Ball and Mr. Edward Macbean, and the treasurer (re-elected) Mr. Walter Besant. This lodge, which has not yet completed the first decade of its existence, was established on a literary and artistic basis; and the subscribers to its printed "Transactions," who are distributed over the face of the globe, already number nearly two thousand.

THE fact that two ladies were proposed as members at the last meeting of the Architectural Association is recorded in our columns this week, and has moreover been further thrust upon us by the receipt of a couple of indignant epistles from two members of the Association (not very much known to fame), calling upon the members generally to collect in numbers at next meeting and resist this unseemly innovation. We hope they will do nothing of the kind. There is no possible reason why ladies, if they have studied architecture thoroughly, should not practise as architects, except the single objection that personally climbing about buildings in progress is not very convenient or suitable work for women; but some architects of the other sex shirk that too. We presume the candidates are the two ladies who are known to have been working for some time in the office of an eminent London architect; we understand that they are bent on serious work, and they deserve credit for their spirit in facing a little probable foolish opposition in order to get the same advantages of study which other architectural students enjoy. The extension of the field for the exercise of women's abilities is one of the most important questions of the day; the best minds of the day are in favour of it; architecture is certainly a perfectly refined and unobjectionable study for women to take up; and if the Association repulses these lady candidates we think it will make a mistake, and will show itself wanting in chivalry, besides being behind the times.

THE ARCHITECTURAL ASSOCIATION:

HOW TO STUDY DESIGN.

THE second meeting of the members of this Association for the present session was held on the 10th inst., at No. 9, Conduit-street, Mr. E. W. Mountford, President, in the chair.

Mr. P. T. W. Goldsmith, senior Hon. Sec., read a list of nominations, the President calling attention to the fact that for the first time in the history of the Association two ladies had been proposed for election.

The following gentlemen were then elected members of the Association, viz., Messrs. A. C. Dickie, L. F. Crane, E. Nicholson, W. L. Schmolle, D. P. Jones, H. J. Triggs, H. Arguhamon, F. L. H. Fleming, S. H. Underwood, A. Lovejoy, A. Atkinson, P. E. Culverhouse, D. Montagu, H. Y. Boreham, W. G. Clark, S. L. Crosbie, T. Tyrwhitt, A. Measom, E. F. Firmin, L. Moggs, R. Phillips, C. Parker, A. Flower, R. G. Bennett, E. H. Evans, A. Miller, E. A. MacDougall, W. F. Coombs, H. Lyon, C. F. Whitcombe, T. H. Bates, Kirkland, B. H. Webb, G. P. Reading, A. J. Torrance, E. Bates, H. P. Gordon, S. D. Kitson, J. H. B. Foss, P. J. Farrer, G. D. Tupper, and R. Marshall.

On the motion of the President a hearty vote of thanks was accorded to Mr. A. W. Earle for the manner in which he had managed the business of the late *conversazione*.

Mr. Earle, in replying, remarked that the expenditure had been reduced this year by 58l. Mr. A. Beresford Pite then read the following paper on "How to Study Design."

Is it possible to design in harmony with the spirit of the age we live in? or to distinguish between the archeological and architectural beauty of ancient buildings? Why cannot we design buildings as an engineer designs an

unsophisticated iron railway bridge without the result being hideously ugly? Will not the terrible buildings of the Victorian Gothic era with which our land is bespattered have in the eyes of succeeding generations the same beauty (is it architectural or archeological) that the crude classic productions of the Jacobean and Queen Anne periods have in ours? and if so, why do not we see the beauty of our bad architecture? Are not we perhaps on the wrong tack altogether and only manufacture picturesque grottoes of ancient relics while the genuine and characteristic architecture of our age is to be found in the works of engineers, mill and factory builders, and gin palace fitters?

Are the congeries of Mediæval and classical oddments, whether in plan or detail, that compose both our domestic and ecclesiastical architecture, really works of national art? Are not workhouses and hospitals or a Metropolitan Tabernacle or railway station interior nearer the mark? Do not architects, so far as their revived pedantries of art are concerned, run a great risk of becoming mere exotics, useful, perhaps, in arranging the business of a building, but to the world at large, as artists, idiotic in expression and utterance?

Can architecture as now practised by its professors continue to survive when the *débris* of the ages has been rummaged through and there is nothing new to revive—when the history of architecture has been learnt in vain, and the poor history-bred architect can no longer find fountains for priggish ready-made details from?

Must we really come to the conclusion that clothes can only be made on old patterns, patches and defects included, and not artistic pictures painted of bygone times and not of our own? Is there not beauty or pathos, simplicity or wondrous complexity in our own extraordinary age with its incessantly varying developments, that the architect can reflect in the buildings that he designs for its accommodation? Cannot we hope that some seeds of true architecture may be sown in our work-a-day buildings that may develop into a detailed style possessing true beauty? Does the barren unphilosophical study of our present authorities on the history of architecture assist us one whit, or even suggest to us the idea that our own age is the outcome of history, and that we should pursue its direction and learn its lessons of the motive of its soul rather than hark back again and again to the mere outer forms of nothing but bygone art? "As if that soul were dead?" We may well ask ourselves the plain question whether if the so-called history of architecture comprised the illustrated authorities, a list of which would be short and easily made, was laid as much aside by architects and their educators and examiners as, say, the history of ornament is, though for no given reason—perhaps it is mere forgetfulness—we should be able to design at all? Imagine yourself, if you can, sitting down to design a church or a house in the country with the stipulation that you were not to revive any ancient style in your building, and does not the thought seem both absurd and painful? If so take for your subjects either a factory, say for boot blacking or fancy soap, or a railway station block in which it ought to be both absurd and painful to employ any ancient style, and see how you would be able to get along without the seemingly indispensable history. And yet if history teaches us anything as to the sources of life and motive in design it shows that the Greeks had little or no history of architecture to draw upon and revive, and that the Goths, who probably knew little or nothing as to ancient art deliberately set aside the productions of their ancestors even as types and thought and acted for themselves alone? Can anyone say that the results do not justify their methods of study, and shall we be forced to accept as a conclusion that the less we have of the study of architectural history as at present conducted the better?

Let us return to our examples; the results of your efforts to design either a factory or railway block would probably be satisfactory, and negatively beautiful in proportion to your regretful resignation to the facts of the case, and to your own ignorance of the pictures in your architectural history books, or, in other words, of what different people had done under differing circumstances elsewhere. What positive beauty your work possessed would consist in the manifestation of your skill in the choice, contrast, and arrangement of materials, in the proportions of your building, in its balancing of voids and solids, its recessings, in its simplicity or variety of line, in its unaffected expression of purpose and skilful adaptation to use. Every one of these qualities should be equally evident in the more monumental or domestic subjects, such as the church or country

house. The church having no internal obstructions to sight, and being perfect acoustically, and with the house rejoicing in pure plate-glass windows where necessary; with further qualities such as a perception of the poetry of scale, of rhythm in contrast or repetition of grouping, and perspective, of mystery and distance; with fancy at work on the detail, applied perhaps unconventionally, but always where most effective in execution, and either emphasising construction or decoratively masking it, suggesting intellectual composition as well as picturesque freedom; the harmonious arrangement of features, as well as the application of free ornament and many other ideas in design, with play of light and shade effects of lighting and schemes of colour, all open to the student cut adrift from the modern school of architecture, and an interesting building having naturalness of purpose and real beauty is almost assured, so long as each quality of use and fancy is exercised with reasonableness and decency.

Paraphrasing how far these results will be denounced as ugly by those who imagine that style in architecture is a *réchauffé* of past features we cannot say, but ugliness is a relative term, and is sometimes applied to nature where its use is perfectly absurd.

Some difficulty may occur to the mind as to the quality of ornament not cast in ancient moulds, but the same elements of beauty govern and compose ornamental detail as general architectural design, and there is ever open to the ornamentist the fountain of nature, which, unlike prosaic and traditional sources, is infinite as the sea. Let it not be supposed, however, that by ornament derived from nature, naturalistic ornament is meant as the forms of nature copied in carvings or paintings. The material and the purpose of the ornament, and many other circumstances, must control the conventionality of its treatment. Remember that a world of art and design exists between the Parthenon frieze and the actual horses and men that Pheidias saw around him, and that if intellectual discrimination is not used in the translation of form and matter, and design is not interposed between nature and ornament, no beauty will be the result. But this is at present a digression apart from carvings and paintings. How about mouldings, capitals, cornices, and purely architectural forms? Can these be designed except by ignoramuses, apart from style and precedent? Most certainly. In your blacking factory example you may only require a dignified and simple cornice of brick and stone to crown the wall, and though, from pure poverty of imagination and defective training, you may have no other resource than a doubly-debased Greek moulding, there is the conceivable possibility of a simple contrasting arrangement of light, shade, and reflection in the elevation considered in relation only to the wants of your front, and also a possible combination of line in contour of curved and straight members, forming an harmonious whole that shall be satisfactory and yet original, furnishing evidence of independence of thought and perception of beauty to your professional critics.

This may sound impracticable, and we expect to be told that ancient styles are the languages of the art of architecture, that their forms and details are its words, and that our fine imaginings without such words and diction are vain and utterly incapable of realisation. That we must learn these languages as part of our education, and trust either to heredity or to fickle fortune to teach us what to say and how to say it. Learn your styles, master your orders, copy them carefully, drum them into your memory, for a senseless reproduction as mere forms, and you will be qualified to become a student of a dignified architectural school, and in addition, if you cram up the mathematics of the proportional ratios, count the columns of the Parthenon, and master a few pedantic technicalities from Gwilt's Glossary of Terms, you may pass the art section of a qualifying examination.

That the training adopted to this end has its uses cannot be denied, for all training is valuable, and, as an introduction to the study of archeology, it may be definitely useful, though this is very far removed from the cultured dilettantism in which it took its rise; but to the architectural student it is purely incidental, and, as at present conducted, the study of the styles of antiquity is in no sense a qualification for the practice of modern architectural design. We may almost venture to say that the study of ancient architecture has had a baneful effect upon the art, and might with advantage be excluded for a couple of generations at least; it has almost entirely thrust out of view the study of design, as the practical and necessary aim of the student, and

has wasted his time and talents with antiquarian researches resulting only in pedantic reproduction.

We are living in an age distinguished above all others for its inventive genius—the prime essential of genuine architecture—for wealth, another essential to the practice of architecture—having a profession of admiration for the arts—famed for municipal enterprise—an age, too, of unexampled peace and prosperity. But architects, instead of growing in public esteem as artists, are losing ground yearly; their works, instead of being characteristic of the whole spirit of the age, only illustrate their own personal fads and fancies and their love for the passing whims of the day. The whimsicalities of the gentler sex with regard to the latest fashion will not exceed in grotesque flightiness the eccentricities of the architects of the last few generations, as illustrated in their periodical fashion-plates or buildings, when they are reviewed say at the jubilee of the Architectural Association.

To what esoteric impulse are the gyrations of the muse of Architecture due, if not to the error of imagining that the past is the present, that ancient means modern, and that archaeology is architecture? What accountable idea underlies the continuous and futile reproduction of architectural antiquities in modern design? Why should a consistent and enlightened race such as the English produce through their architects within a century such anachronisms as the National Gallery and the Royal Courts of Justice, or public statues either clothed in nothing but sheets, without canopies, or in full modern dress (gilded), covered by baldachinos, and surrounded by unprotected figures, mostly females, only ideally clad? What rational theory of architectural design, apart from archaeology, can reconcile the production of St. George's Hall, Liverpool, with the Houses of Parliament at Westminster? Will not posterity justly conclude upon abundant evidence that the Victorian architects were petty-spirited, out of sympathy with their environment, each bent on vindicating some absurd archaeological revival, wholly unsuited to their buildings, and wasting their eloquence in incriminating the age which gave them birth, as lacking faith, as Philistine in spirit and cruel to all the arts, and in bewailing the hard fate that did not cause them to be born Barbarians or Feudal serfs?

And yet our age cannot be said to have lacked men practising as architects possessed of genius and talents of the highest value to architecture, with inventiveness, perception of beauty and form, of wide artistic sympathies, and of remarkable rapidity and adaptability of style. The English architects of the various revivals have been men of eminent gifts and enthusiasm for their art, and probably without their equals among European nations. The Greek revival, based upon the work of Stuart and Revett, Wilkins, Cockerell, and others, was no mere artistic fad; these men were profound archaeologists, and the combination of artistic instinct and antiquarian learning displayed in such works as the beautiful Hanover Chapel—doomed, shall we say, through the apathy of architects?—the entrance to Euston Station, and University College, London, is worthy of unstinted admiration. There is a thoroughness of historical study manifest in these buildings that compels praise; in each case a lofty ideal conception has been attained, and a completeness of architectural feeling for every detail that betokens the earnest designer. Yet in each case the manifest powers of design possessed by the architect have been concentrated upon designing a Christian church as a Greek would have designed a heathen temple, an entrance to a station-yard that is but an enormous sacrifice of the art of architecture at the throne of the railway demon, and a college that for more than a generation was but a feeble outbuilding to a portico which was an approach to emptiness.

In each instance the march of time and the progress of national life have branded the works on which the architects bestowed such earnest care as anachronisms, impressive only as monuments without usefulness, and standing proofs that antiquarian design is not what this living go-ahead generation requires.

The Gothic revival which raged its turn after the Greek, and had an Italian rival as well as offshoots of its own to compete with, commenced, flourished, died, and is condemned upon the same archaeological grounds as the Greek movement that we have just described. The presence of rivals produced friction, and the contesting archaeologies each claimed antiquarian precedent only as their ultimate test of beauty.

Is it not utterly illogical and ridiculous to reflect that the beauty or propriety of nineteenth century architecture should be judged by the accident of birth to some detail either in the twelfth or thirteenth century or some corresponding epoch. Traces of this error can be still observed in architectural examination question papers.

In ecclesiastical design the iron bondage and dead weight of antiquity was endured longest, but when the inevitable revolt came it was only to resort to foreign types for a while and then to return to some period of hitherto forbidden fruit at home. The absurdities of most of this work are manifest to us now, but it is only a very short time ago that tremendous efforts were made to combine incompatible elements and to compel the nineteenth century to wear the cast-off clothes of its mediæval ancestors. But all dead men's clothes soon wear out and want replacing.

What shall we say to the revivals of the use of indistinct glass in small pieces fastened together with lead straps, of rough rubble walls unplastered, of chilly paved halls, of wide-mouthed, open-throated chimney openings, of confining the influence of the fireplace to the ingle nook, and numberless other barbarisms that have made us laughable to the world at large? And to what other lengths of imitative foolishness will not this historical method lead those who will blindly and unthinkingly follow. Apart from all questions of use or comfort, what beauty of form or of architectural idea is there in half the tricks of design and construction by which a modern building is made ancient in character? But aside from the fact that the Goths did so, we could give no reason, good or bad, for more than half of modern Gothic architectural design. The disposal of thicknesses in walls and buttresses, the scantlings of roof timbers and their framings, are governed by considerations which were good in days when walling was not paid for by the rod and timber was not purchased in scantlings at the Surrey Docks.

The fact is that English architects have been first bewitched with one beauty and then with another, and have finally endeavoured to be in love with all the beauties at once; in losing their hearts they lost their heads, and have lived in a mediæval dream of bliss while the nineteenth century marched on and left them further and further behind in what is really a morass of archaeology, out of which no path to real living architectural design can emerge.

As we endeavoured, however, to give the modern Greek architects their due, those of the Gothic Renaissance must not be dealt with unfairly. We are to this day living under the romantic charms of their Mediæval England, and it is doubtful whether we can fairly gauge the verdict of the future on recent work. Great perseverance and consistency, an exact thoroughness of observation, a quick perception of the artistic qualities of picturesqueness, local beauty and appropriateness, a widening sympathy, still at work, for all the crafts and arts connected with home and civic life that flourished alongside architecture in Mediæval England, a general soundness and simplicity of construction equal to that of the Mediæval master builders, characterise the work of the leaders among modern architects of the Gothic revival. These men have absorbed themselves entirely into the spirit of a past age, and have succeeded in attaining their ideal—to live architecturally in the Middle Ages; and they can and do produce for us genuine works of art in all branches that compel admiration. Take a country house by a leading architect of the present day for an example, how picturesquely its rubble and half-timbered walls group themselves upon the hill, with what stern reserve the battlements crown the walls, and behind them at sufficient distance to allow of the passage of a cross-bow man rise the quaintly waving tile roofs. How the tower crowns the landscape, with what a sense of protection the high court yard walls enclose the entrance. What broad unwindowed surfaces of wall seem to defy the missiles of pre-explosive warfare. The mullioned and latticed windows, the timber framings, the stone jointing, the ancient leaden conduits, the very grin of the gargoyles all bespeak the thoroughness and perfection of the Mediævalism, which only consummate talent could realise for us in this most unmediæval age. How thoroughly the artist has grasped his problem too! Side by side with the architectural consistency one is conscious of a subtle artistic charm that seems to catch and secure effects in the modern building that the hand of time alone effected in the old prototype. The harmony of colour given only by age is sought for, the rapidly weathering tiles, the dark-toned bricks, the fumi-

gated timbers, the coloured parqueting all are carefully considered and deliberately carried out to fix the Mediæval impression upon the mind, and emphasise the doctrine that nought but what is old can be beautiful in this grossly unartistic age. The internal arrangements are even equally Mediæval. With the homely charm of an ancient grange is combined the comfort of a modern house, but the essence of the charm is its antiquity. Hence, the quaint crookedness of plan that produces picturesque passages, the variety of levels, the deep window recessings, the great hall, the beamed ceilings, the panelled linings and numberless artistic methods of carrying the mind back to the times before this Rip Van Winkle of architecture either went to sleep or was born. The result is indubitably charming. It is artistic archaeology tempered with civilisation! the dish itself, as well as its trimmings, is Mediæval! it does everything that is possible to put the hands of the clock back three or four centuries, but it is not modern architecture.

In ecclesiastical buildings we have similar results. The hapless chances of ancient church history and building are reproduced with skill and patience. The acme of modern ecclesiastical art consists in the perfect realisation of what a beautiful fourteenth or fifteenth century church would have been, and as before, the laborious and earnest efforts of the artist have succeeded in a short span of life in running the gamut of the centuries and in reproducing in effect and feeling the presentment of the departed spirit of Mediæval art. In fact, often no higher praise is required than that the purity, beauty, and other qualities of ancient art are to be found in their present day counterfeit. The counterfeit is not dead, but practically living. We have a definite Renaissance of Mediæval ecclesiastical art, our cathedral work. Our churches, large and small, and our colleges, are the productions of a living school of artistic architects for whom, with their domestic brethren, we cannot but feel the warmest affection and enthusiastic admiration but they are exotics, they are contemporaries of Wykehamist William, of Harry the Eighth with his palace of Non-Such, of Spenser and his Faerie Queen. They sing with Shakespeare:—

Tell me where is fancy bred,
Or in the heart, or in the head?
How begot, how nourished?
Reply, reply.
It is engendered in the eyes,
With gazing fed; and fancy dies
In the cradle where it lies.
Let us all ring fancy's knell;
I'll begin it—Ding, dong, bell.

and they consistently suit the action to the word and bury true architectural fancy in a grave centuries deep.

We will not stop to discuss whether Queen Ann is dead or not, though she is evidently a guiding star still to the thirsty revivalist who, with faithful discrimination forsakes, with the progress of civilisation, such barbarities as metal casements for the newly invented double-hung sash, and welcomes a small increase in the size of manufactured glass that enables him to employ wooden bars of moderate section instead of small lead straps. What would not our deceased majesty have given, or that great architect Sir Christopher Wren, either, who preceded her, for such beautiful sheets of plate glass as now adorn our shop fronts? Oh, Revivalist, learn to follow the progressive movement of all real art, and become a designer of architecture instead of a mere dealer in her artistic antiquities.

We must proceed to draw our conclusions. We are not able to complain of real lack of architectural opportunity, and there is no want of architectural genius and capacity. Our architects are, however, devoted to a more or less stupid archaeology, and therefore have ceased in any effective way to be artists for the age. Why should not this be remedied? Cannot we set ourselves, instead of against the stream of time and progress, with it? Why should not the requirements, methods, and opportunities of the men of our own time be studied, and our minds trained to fix themselves upon the universal characteristics of living art instead of upon its past expressions only? As there is no true art in representing a labouring man, rough hewn and coarse perhaps, but perfectly beautiful in degree, at his rugged work, as wearing fine clothes or a mask of Apollo, so let a warehouse front represent a warehouse, a railway station appear to be what it is, beautiful only in its sensibleness and greatness as a station, and as a station only; and let this sensibleness and a simple beauty take the place of the hopeless affectations of domestic design, and we may yet begin to earn

back again the wages of public esteem and confidence that we have forfeited by our archeological heresies. Have you ever discovered that the true beauty of architecture is to do thoroughly and manifestly what it is meant to do—whether to be ornamental, comfortable, monumental, or useful, as the case may require? For instance, what a solid impressiveness and grandeur there is about the vast supports and trabeated construction of the entrance of the Great Eastern Railway into London, between Bethnal-green and Bishopsgate. This singular work of engineering is most architectural, and has stern and earnest beauty of character. Similar effects can be often if not always found where constructors have to make great effort to cope with difficulties, and some of the brick-and-girder engineering of the Metropolitan Railway is of this class, and has present in it, and manifestly so, most of the elements of sound architecture, and will, without any doubt, be regarded, by the broad verdict of the future, as some of the most characteristic buildings of our day. Why should architects segregate themselves, as if afflicted with an ancient leprosy, from the life of the city and world of to-day? Why should they leave all that is simple and direct in architecture to engineers, and lose their right to even the barren title of architect? Has not the Forth Bridge a piquant power of form, and a real, if not ideal, beauty, without the assistance of what you and I call architecture? And does it not compare favourably with the Tower Bridge, which, unless some dreamt-of convulsion happens, will for many generations be a monument of architectural failure, if great effort made to impart so-called art and architecture to a structure that left to itself would have been much more natural? Also, in other directions, why are characteristic buildings of the age, such as the Crystal Palace and the Albert Hall, eminently works of architecture, though not of architects? And, one must add, not the block of Science Schools at Kensington, so impressive in mass and form, and so thorough and beautiful in detail and decoration, the work of an architectural amateur, and does it not assert its dignity successfully amidst all its modern practical rivals?

Is it not true that we considered and reconsidered our methods until we find ourselves facing the problems of our practice, not as champions of past style and dead art, but as equipped artists who facilitate the advance of architecture by meeting heartily the spirit of the age in order to adapt her materials to their best uses, to accept her requirements for their greater usefulness, and to suitably and expressively ornament where required? To discover the true beauty there is in all building truly and simply done, and to emphasize it, to proportion it, to mould it for the use and enjoyment of all. To throw aside the tattered scraps of paper design, and to realise that such trifles as the small panes of glass of which windows are spoken, with many others that are—foolish though it seems to say it—so indispensable to the modern architect, are quite unworthy of ourselves. Let us see that, shorn of a fictitious archeological interest, our buildings may be beautiful in themselves as characteristic products of our high civilisation. Be natural as all the great architects have been before you. Learn by the true historical method the motive and spirit of past art; see if the Greeks, who built a beautiful monument as a temple to Athene, together with the ecclesiastical and military engineers who erected the cathedrals and battlements of the Middle Ages, were not as removed from you in the way they set about their work as possible. Was not their architecture a pure product of their age! and should not ours be so too, in spite of that haunting fear of fitness, indefinite enough for any bogey, which will cease to trouble you when once conscious that you have succeeded in doing simple and beautifully serviceable construction, adjusted and controlled by your trained artistic instinct.

The growth and practice of the great Renaissance of Art in the sixteenth century will bear the closest examination in the service of modern architecture. The motive of its artists is equally good, though widely different; but do not imagine that it was a mere revivalism of archeology. No restoration of ancient buildings was attempted, a genuine and wealthy architectural genius fed on the beauties of past ages, only to develop itself in the most wonderfully modern achievements, not only of construction and arrangement, but of all and of all accessory art. Michelangelo, Rome, with the Baths of Caracalla and the theatre before him, conceived and constructed St. Peter's, and the true historical method of study that discerns how and with what ends he did it, will take the idea and motive as its guide to

like results. The study of the *design*, or rather *designing*, of any one great building at home or abroad is the most fruitful source of profit to the architectural student. The history of the idea of St. Peter's, for instance, as it gradually grew from the work of Rossellini and Alberti to that of Bramante, San Gallo, Raphael, and Peruzzi, before Michelangelo commenced his enormously grand and complete conception is most inspiring and instructive, and of infinitely greater use than a complete calendar of every architect that ever was known, with dates and nicknames. This example of a great architect's power can be studied alongside with the expression of the same ideas of breadth and power of form in his sculptures and paintings, and in fact there is a whole education in the universality of artistic expression in such a historical study of principles. St. Paul's, London, is a similar example, as we happily have the whole scheme from start to finish to study. Observe the way in which Wren grasped his problems, and grasp your own little ones with similar firmness, courage, and breadth of idea. Take even more ancient buildings. Try St. Mark's, Venice, or an English Cathedral, and consider the alterations and additions, not as if executed in a delirium of irresponsible building fever, but as having a definite architectural purpose and idea in view. Why were these domes added? is a more important question than who added them. Why was this old front extended beyond all the limits of the buildings behind it? is a more important question than who did it, and did he know that it was a sham? Let us suggest to eminent examiners that the question Why is the Parthenon beautiful? is a much more vital one than in what technical terminology pedants would describe it or how many columns compose the portico? and other like trivialities.

Until we seek to study the reasons why things are beautiful, we shall never know how to design. Some naturally may have an intuitive perception that is denied to others, but for all that, the beautiful is but the revelation of unseen truths, and when revealed by this perceptive faculty, the lessons of the beautiful are manifest for all.

The teachings of the ages are in the effects that their works produce upon our minds, and it is little short of absolutely folly to confine the training of architects in design to exposition of the mere forms of the language of architecture, and deny them insight into the meaning of the words used. Each stone, each plan embodies an idea that gave it existence at the hands of its constructor. Let us, as we have never done yet, seek to read this out of the stones, and enlarge our apprehension of beauty and of the possibilities of an art of design accordingly.

Mr. W. D. Caroe, in proposing a hearty vote of thanks to Mr. Pite for his eloquent and suggestive address, congratulated the Association generally upon the excellent attendance of members that evening, and upon the fact that the spell had at last been broken, and that there was a full house. He believed many of those who had come that evening would be pleased to have heard Mr. Pite blow all our unfortunate nineteenth-century architects to the winds, and teach them to take their proper place behind the engineers, and amateurs and other such nineteenth-century artists! The moral Mr. Pite had in view in his paper was that architecture should be simple and reasonable. He had very distinctly differentiated between admiring beauty because it was old, and admiring it because one saw and understood why it was beauty. In enforcing his view, Mr. Pite had not spared the copyists of old work, and no one agreed more thoroughly than he (the speaker) did, in thinking that architects had been accustomed to regard what was called style, that is, ancient style, too much in their architecture. Only the other day he heard an architect refer to the great advantage it would be if they had collections of sculpture, showing what could be done in thirteenth, fourteenth, and fifteenth century work, &c., so that if anyone was wanted to work in such and such a style, one could say, "Here is the man who can do it for us." This was the sort of thing Mr. Pite would condemn, but, at the same time, he would be the last man in the world, as his own work showed, to say that there should not be scholarship in architecture. It was discriminating scholarship more than anything else, that would teach them when architecture was reasonable and simple. What they were suffering from now, as the President of the Institute said the other night, was a plethora of ornament, and Mr. Pite had specially referred to

the evil of ornament, merely plastered over buildings and culled here and there from old examples without having any vitality in it. Mr. Pite, while showing up this fetish of copyism, referred to the fact that they should study how Wren had built St. Paul's, and how Michelangelo had designed St. Peter's. He had thus pointed out that it was right to go back and to study the old work, but not to imitate it. He disagreed somewhat with Mr. Pite as to the causes why nineteenth century architecture was so often a feeble imitation of the past. He (the speaker) believed the causes were rather due to the extreme complications of the age in which they were living—the ready access they had to books and photographs, and the power of travelling they possessed. The vernacular of the nineteenth century, as the late Mr. Street said, was the architecture to be found in the small suburban streets, but he did not think Mr. Pite intended such to be taken as their examples of modern architecture. There were some small details on which he differed from Mr. Pite. He did not see why, when they were honestly building, apart from archaeology, glass, when broken up in small pieces, was less beautiful than when it was used, as plate glass, in single sheets. Indeed his own personal reason for objecting to plate glass was that it had, viewed from the outside, no texture, and as such ought to be condemned in connexion with architecture. Moreover, if the glass was broken up into small pieces, one had the sense, when indoors, of the cosiness of being in a room, and not feeling, as in looking through plate-glass, that one was living in the open air. He believed he was right in drawing the conclusion that Mr. Pite did not mean to decry scholarship among architects, but simply to decry copying in architecture, which was not scholarship or design at all.

Professor Kerr, in seconding the vote of thanks, said it struck him that the general point of Mr. Pite's paper was its suggestiveness. Critics of a certain school would say it was vague, and no doubt it was, but it should be remembered that the subject was one which was not easily defined. Mr. Pite, however, had suggested a great deal, and to those who constituted that audience suggestiveness was perhaps better in the end than definiteness carried too far. He would like to correct Mr. Pite in one matter of history; he having alluded to the buildings at South Kensington as having been designed by an amateur. That was not the case, because, although Mr. Cole and others determined to do without architects, they could not get on without architects' clerks. Without contradicting Mr. Pite, he would say there were only two styles of architecture that had ever been devised in this world—the one being the Classic and the other the Gothic, the former, strange to say, being the style of the nineteenth century. The principle of the column and entablature began in Egypt and Assyria, and descended to Greece and Rome. Then Christianity, amongst other things, overthrew Classical architecture and introduced a style of its own. Roman architecture terminated with the Colosseum, and Christian architecture then passed into the Middle Ages and became characteristic arcuation, which was carried forward in Western Europe by the pointed arch—a delicate matter of historical criticism. Gothic architecture then flourished, and became perfected with great rapidity, passing through its whole career in about 400 years. When the Christian architecture had run its course, the revival of arts and letters led the intellectual world again to Italy, the Renaissance architects took up the career of Classic architecture where the Colosseum had left it, and it had been carried on ever since. In France there was nothing else, that country being the leader of artistic development. The Victorian Gothic was a purely English movement. The High Church party took up the Gothic where it was left in the fifteenth century. The architecture of any country, in any age, was a sort of mathematical equivalent of the condition of the country at the time.

Mr. Langton Cole said that the motto of Mr. Pite's lecture seemed to be one they should drive into their minds throughout the whole of their professional course, viz., that art is the expression of an idea. Two things followed from that—first, that unless they had ideas they could not have art, and, secondly, that unless their ideas were good their art would be bad. It seemed to him there was some hope of rising from the pessimism of Mr. Pite, true enough though it might be, if they would only endeavour to put some idea into the whole of their work. He agreed with what the lecturer had said as to the study of the Orders, and he almost wished the

painful study of these could be deferred or abolished altogether. At the same time, one could not help feeling that architects must be scholars, and one could only wish, in the words of the President of the Academy, that the knowledge of the past should not be an irksome burden, but rather a precious heritage. Referring to the Tower Bridge, he was prepared to defend it as a structure in which steel was a necessary component, and its designers were quite justified in casing the steel, as far as it was possible to do so, in solid and lasting granite. In fact, the construction of the building was very fairly expressed in its design.

Mr. Seth Smith remarked that he had derived much enjoyment from Mr. Pite's lecture, which had given him a great deal of suggestive thought. It all seemed, however, to come back to this—that they had been making a mistake, which most of them would now admit, in too closely studying the precedents of ancient work. He felt sure Mr. Pite was right in his opinion—that in these days of invention there was plenty of originality to reflect itself in architecture. He believed that progress was being made in exact proportion as they studied the best work of the day, and thankfully adopted those novelties and inventions which were successful, at the same time thinking for themselves, and trying to improve upon them.

Mr. Cole A. Adams, in cordially supporting the vote of thanks, said that whilst listening to Mr. Pite he had felt cast into the lowest depths of despair, and he could not help thinking that the lecturer had been too pessimistic in his remarks. Mr. Pite said, what had been so often remarked in that room before, that a building should express its purpose: of course it should: but had we not buildings in modern times by the hundred, which did this? There were men of strong original thought who, holding what Mr. Pite had said as to what the results of their studies should be, had produced buildings which were the admiration of men of culture. Surely, too, the testimony which came from France as to the architecture of the present time in this country was full of hope. Were there no buildings at the present day which would hold their own? He need only mention the names of Butterfield, Street, Scott, Burgess, Pennethorne, Smirke, and others who had produced buildings of marked originality and expression. A careful study of the works of the past was essential, and the most cultivated and original architect would frequently be found in him who had most carefully studied the past. He would like to mention the name of one who had ever been a good friend of the Association—he referred to Mr. Sedding—who adopted a perfectly free use of styles, and in whose church of the Holy Trinity, Sloane-street, although they might not like all its parts, they must at least recognise that it perhaps marked the commencement of a new era. Mr. Sedding broke through the generally-accepted traditions and claimed free trade in art. In conclusion he (the speaker) hoped that the younger members of the Association would not take the gloomy view adopted by Mr. Pite.

Mr. Locke Worthington believed that round London, and in the provinces, would be found buildings capable of being compared with some of the finest structures in the Classic or Gothic styles. It was a misfortune that so much of their enthusiasm was given to external and internal veneer. A building, when completed, should declare its construction, both inside and outside, and its beauty should be based on the education of the man who designed it.

The President, in putting the vote of thanks to the meeting, said they would all agree in thanking Mr. Pite, who had put off a visit to the East so as to be present amongst them that evening, although his following lectures would have to be postponed. With much of Mr. Pite's paper he entirely agreed. With regard to the study of ancient architecture, it was possible to study it too much. He believed that Mr. Pite took too serious a view of the bad state of English architecture at the present moment. They were not so tied to certain styles as Mr. Pite seemed to think. A few years back it was essential that a building should be in some well-known style, and that all the details, from top to bottom, should be historically correct. They had got a little beyond that now, and it would be found that in all the great buildings done by first-rate men, although they had copied the spirit of certain styles more or less, the details were all fairly original. Should the historic New Zealander ever come over here, no doubt he would find much to admire in nineteenth-century work, especially in Sedding's or Norman Shaw's buildings. He believed in small panes of glass, and disliked plate glass, which was simply horrible on

account of the polish of the material. Small panes, too, added greatly to the comfortable appearance of the interior of a house.

The vote of thanks to Mr. Pite was then put, and carried by acclamation.

Mr. Pite, in reply, said that in whatever criticism he had made, he had been careful rather to speak generally of architects and architecture as a whole, but the mere fact that in the discussion only one or two names had leaked out, of men who were exceptions to the rule, would be taken to justify the rather sweeping or general view he had expressed. He was aware, for instance, of the charm of Sedding's work, but if it were not so riotously original, it would be a little more characteristic of what a worshipper in an English church would have enjoyed. Holy Trinity, Sloane-street, was, without doubt, beautiful, but he would like to cross-examine some of his friends as to why it was beautiful. He agreed with what Mr. Caroe had said about the requisite scholarship in an architect's training, but what was wanted was a scholarship that would make men think, and not merely copy. They should think out the problems of design even in detail for themselves, and not fall back on picture-books of architecture. The vernacular architecture of the day, he was conscious, could only be described as jerry architecture, and he had asked whether there was beauty in this, because unmistakably they saw beauty in the jerry architecture of Queen Anne. It was possible that future generations would copy the stucco pediments and abominations of suburban architecture as illustrative of our own generation. With regard to the study of history, they should try and find out what its motive was, and not merely use it as a fountain for imitation. As to the plate-glass red-herring that he had drawn across their path he would candidly confess that he could not design a decent window unless he drew lines across it. At the same time, he knew no race of individuals who thought well of small panes of glass, except architects, and that condemned the whole thing. Light had no texture unless it was full of fog or mist, and the dust or fog of the architectural intellect was very well illustrated by those little panes of glass and all such abominations. As to the Tower Bridge, Mr. Cole was quite welcome to his steel legs in granite breeches. He had been referred to as a pessimist, but the most would rather be a cheery pessimist than a gloomy optimist. He took a very hopeful view of modern architecture, though he found it rather difficult sometimes to make up his mind as to what style he should design a building in, but he did not consider that need make him want altogether to throw up the job. He was obliged to Professor Kerr for correcting him as to the South Kensington buildings; though the Science Schools building was, he believed, designed by Mr. Godfrey Sykes, who was not an architect.

The proceedings then terminated.

ARCHITECTURAL ASSOCIATION, DISCUSSION SECTION.—The first meeting of the Discussion Section of the Architectural Association for Session 1893-4 was held at No. 56, Great Marlborough-street, W., on the 15th inst., Mr. C. H. Brodie, A.R.I.B.A., in the chair. A paper entitled "A Few Notes on Iron-work" was read by Mr. M. Garbutt, A.R.I.B.A., and a discussion followed, in which Messrs. Greenop, W. H. White, Stockdale and the Chairman took part, and the whole subject was summed up by Professor Henry Adams, M.Inst.C.E., who attended as special Visitor. Votes of thanks to the author of the paper and to Professor Adams concluded the meeting.

COMPETITIONS.

VESTRY HALL, CLERKENWELL.—We understand that the selection in this competition is as follows:—1st premium, Mr. W. C. Evans Vaughan; 2nd premium, Mr. A. Saxon Snell; 3rd premium, Mr. E. J. Harrison.

LECTURES, QUEEN'S COLLEGE, CORK.—A course of lectures on "The History of Architecture" is to be delivered at this College by Mr. Arthur Hill, F.R.I.B.A., commencing on Nov. 25. This is, we believe, a new departure in the programme of Queens' College, and one we are very glad to hear of.

TRADE CATALOGUES.—Mr. W. Cooper sends us his catalogue of horticultural plant, including farmyard constructions (pigeon-houses, kennels, &c.), greenhouses, hot-water pipes and heating apparatus, boilers, tents, garden implements, &c., even including temporary churches and their fittings.

Illustrations.

BIRMINGHAM GENERAL HOSPITAL.

WE give this week a large view of this hospital, in which architectural effect has been combined with practical arrangement and construction more completely and successfully than is usual in large hospital buildings.

Shortly after the competition was decided we gave, by the courtesy of the architect, illustrations of the plans and geometrical elevations to a small scale, accompanied by a long description, extracted from the architect's report, of the construction and arrangement of the building, which will be found in the *Builder* of March 26, 1892; so that it is hardly necessary to give any detailed description here, which would be in the main a repetition of what has been already said. But we are enabled to add here the detailed plans of two of the floors on a larger scale.

The architect is Mr. W. Henman, of Birmingham.

STAIRCASE, BURGOS CATHEDRAL.

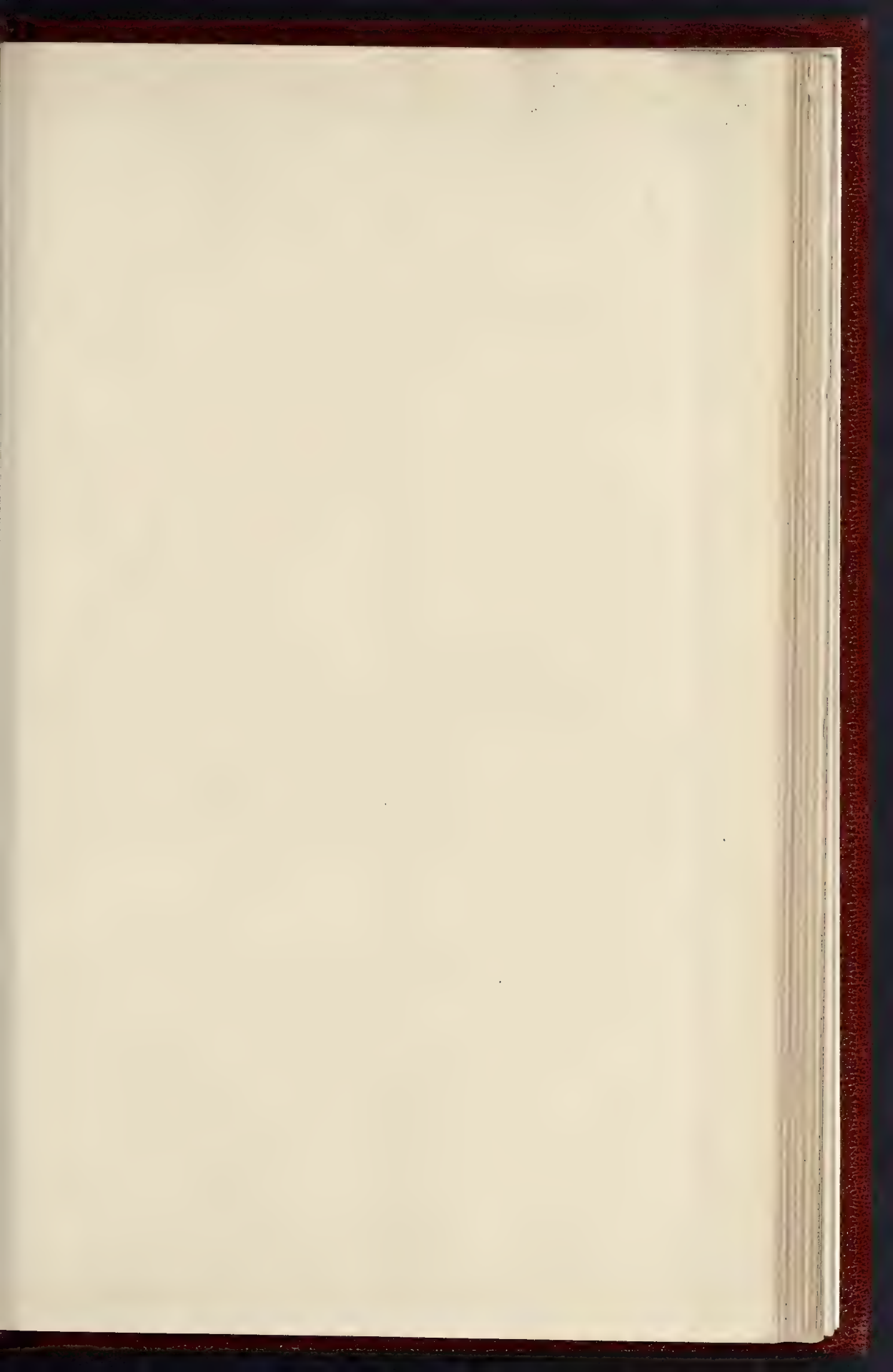
This illustration is a reproduction of one of the drawings published in Mr. Prentice's fine book of illustrations of Spanish architecture of the Plateresque period, referred to in another article in the present number. In selecting, with the author's and publisher's permission, a plate for publication here as an example of the contents of the book, we might have chosen one which would have been more effective and striking from an artistic point of view than this; but in making the selection we thought we could not do better, for the purposes of this Journal, than take the opportunity of putting on record in our columns an accurate delineation of the design and detail of this famous staircase, built by Diego de Silos (1519-22), which has been the delight and wonder of many generations of tourists and artists, but has usually been illustrated more from the painter's than the architect's point of view. To many in this country it is probably best known by the engraving from David Roberts's spirited but somewhat too imaginative picture; to the architect a presentation of the details as they actually are is of more value than a painter's transcription of the effect.

CONVENT OF SAN MARCOS, LEON, SPAIN.

This illustration, like the preceding, appears in Mr. Prentice's book, but is not taken from it in the same sense, as it was photographed for reproduction in this Journal at the time the drawing was exhibited in the Royal Academy of 1892, but was withheld until it should serve some special purpose of illustration. The main design of the façade (erected by Juan de Badajos in the early part of the sixteenth century) is a good example of the mingled richness and classic refinement of the Spanish Plateresque style, sadly marred however by the very ugly and disproportionately scaled clock-case, as it may be called, over the entrance archway. The building is carried out in a rich-toned yellow stone, with a red-tiled roof.

"HURSTBOURNE," HANTS.—In reference to the description of this house which we published last week, Mr. Gilbert Seale asks us to mention that he is carrying out all the stone carving on the work.

NEW STATUE OF THE QUEEN, ABERDEEN.—On the 9th inst. there was unveiled at Aberdeen a bronze statue of the Queen, by the late C. E. Birch, A.R.A. The statue occupies a site at the junction of Union-street and St. Nicholas-street. The site in question was formerly occupied by a statue of the Queen, by the late Alexander Brodie, of Aberdeen, a remarkable work for a young and untravelling artist, but the white Sicilian marble would not stand the climate, and the statue was accordingly removed to the interior of the vestibule of the Town-house, where it stood in a standing position, left foot advanced; in the right hand the sceptre, in the left an orb, and on the head an Imperial crown. The figure is 8 ft. 6 in. in height, and Her Majesty being a familiar sight to Aberdonians, from her frequent journeys to and from Balmoral Castle, the likeness is locally generally recognised as an admirable one. The new statue, whilst bearing a general resemblance to that (in the Maharanee, is by no means a simple replica in bronze, but really a new design. The pedestal was supplied from the Aberdeen Granite Works, and the casting made by Mr. Moore, Thames Ditton.



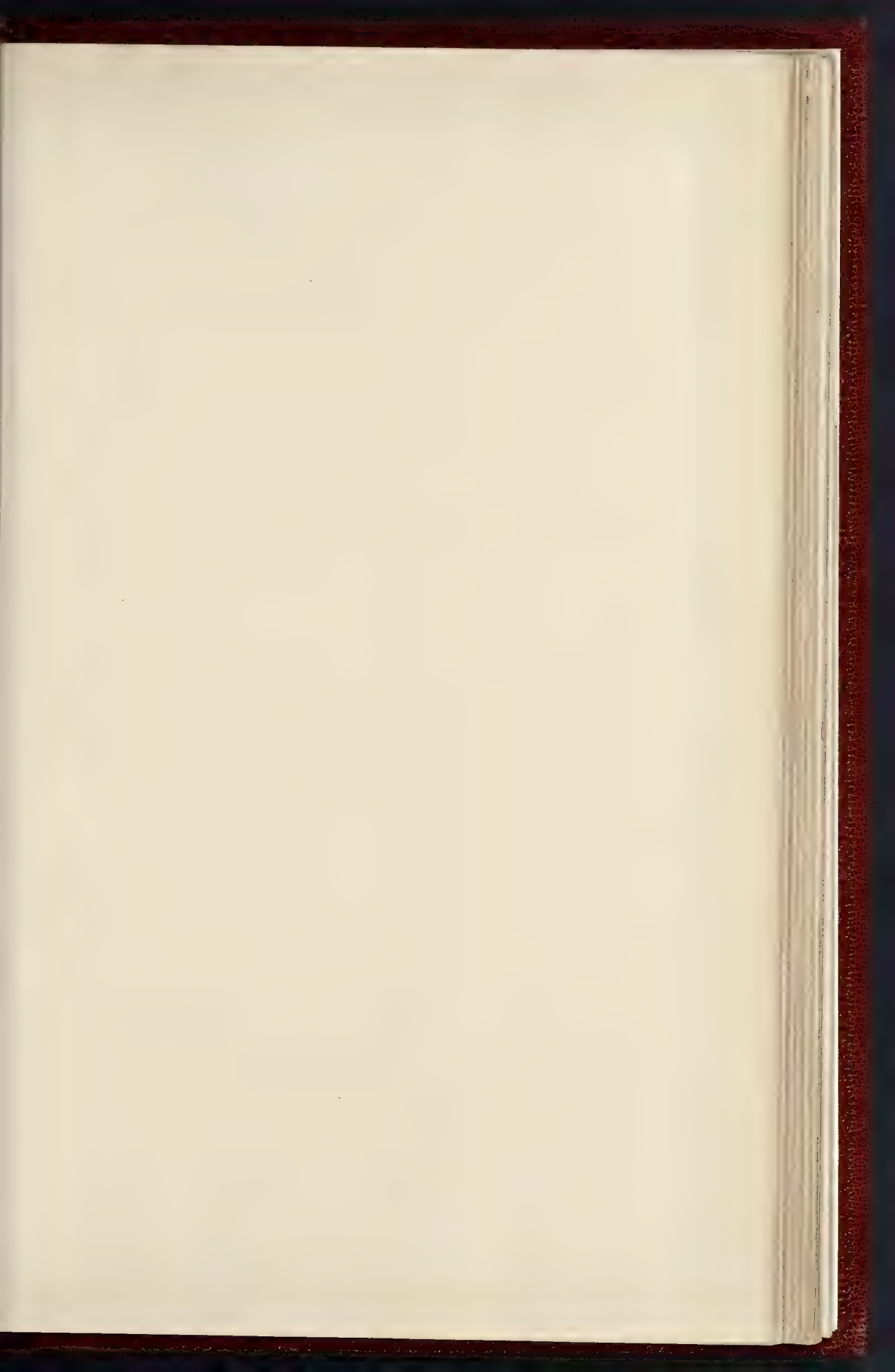


FAÇADE OF CONVENT OF ST. MARCOS, LIMA

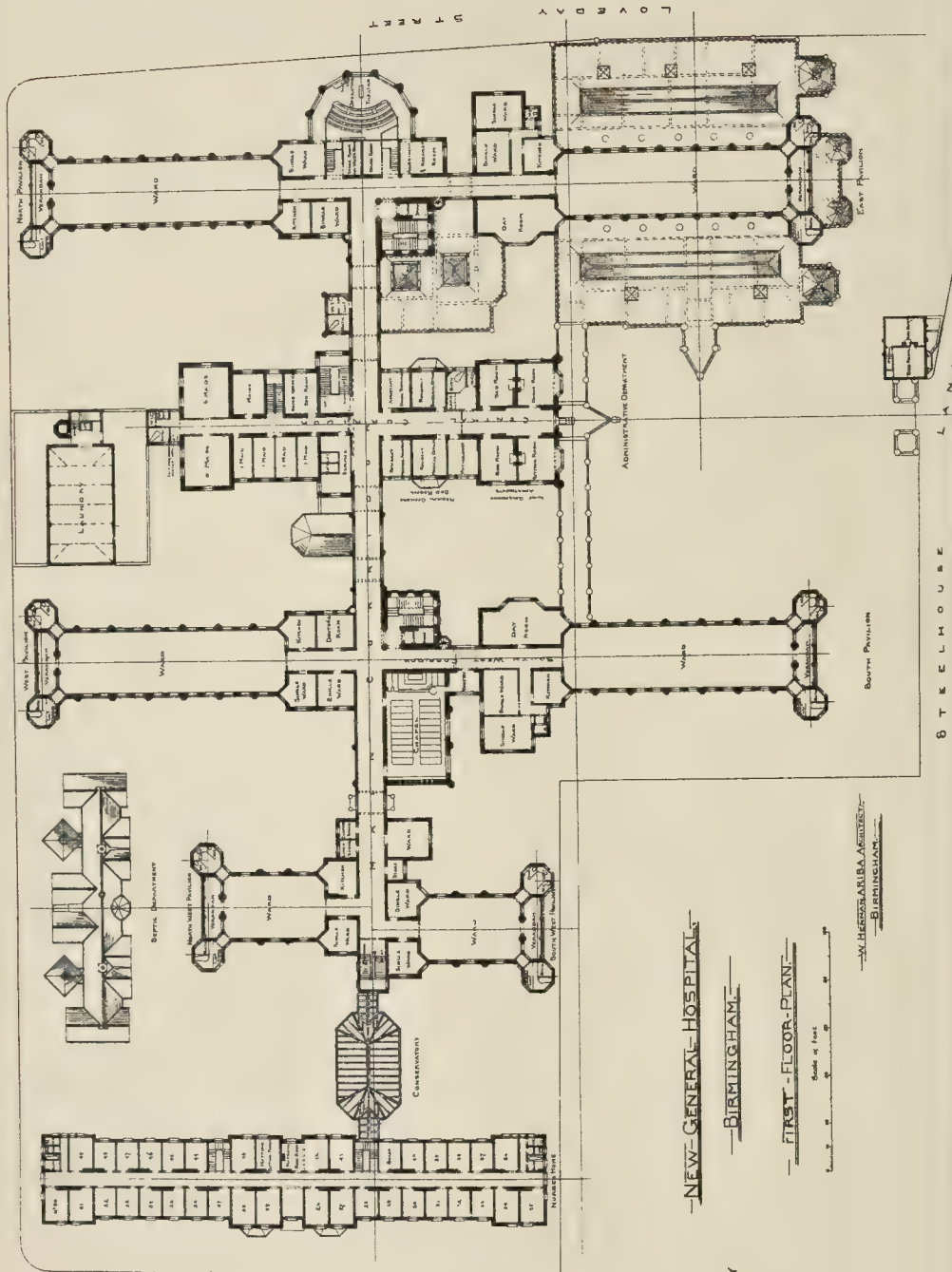
18, 1893.



A DRAWING BY MR. A. N. PRENTICE, A.R.I.B.A.



THE BUILDER, NOVEMBER 18 1893



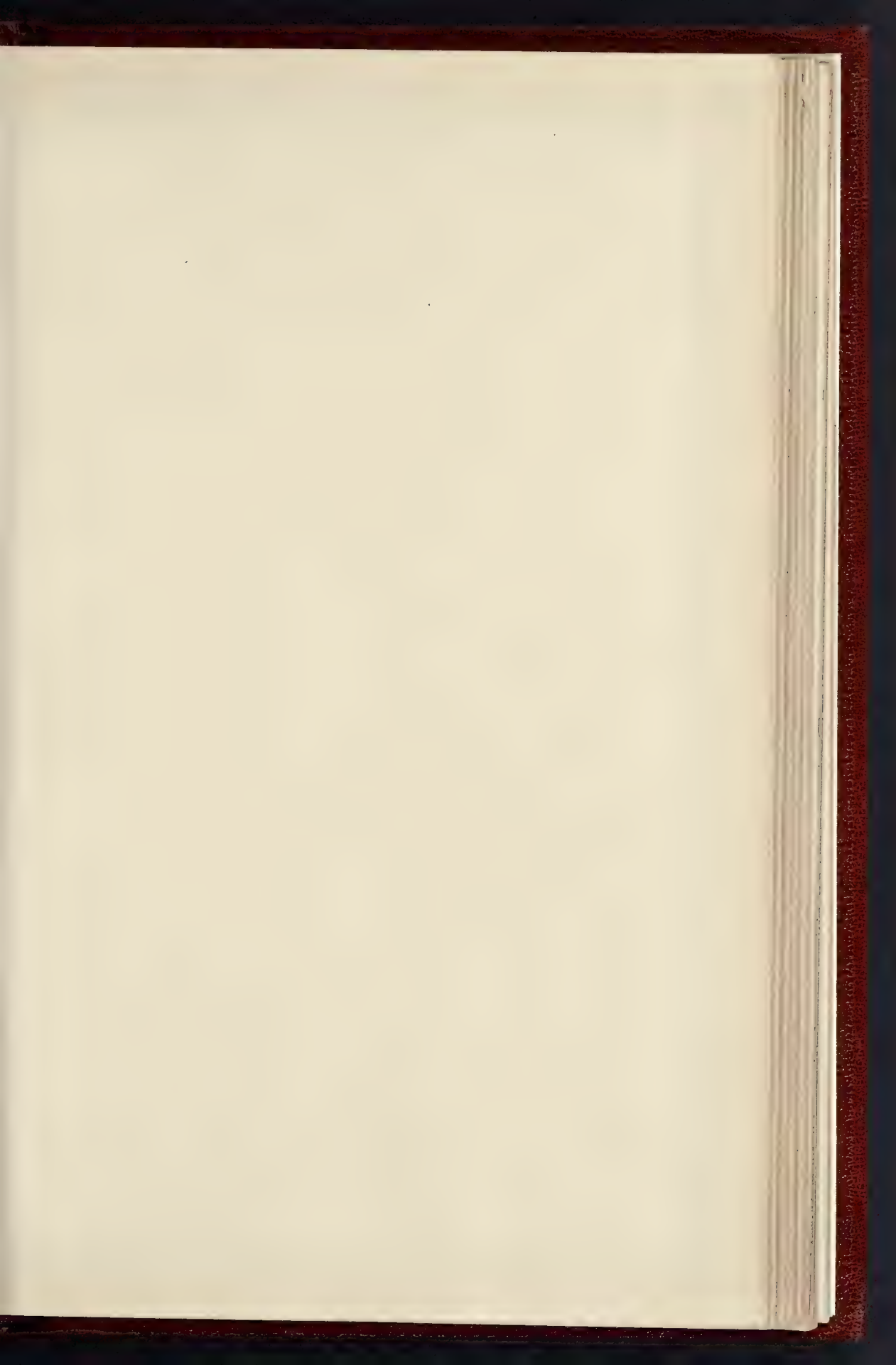
NEW GENERAL HOSPITAL

BIRMINGHAM

FIRST FLOOR PLAN

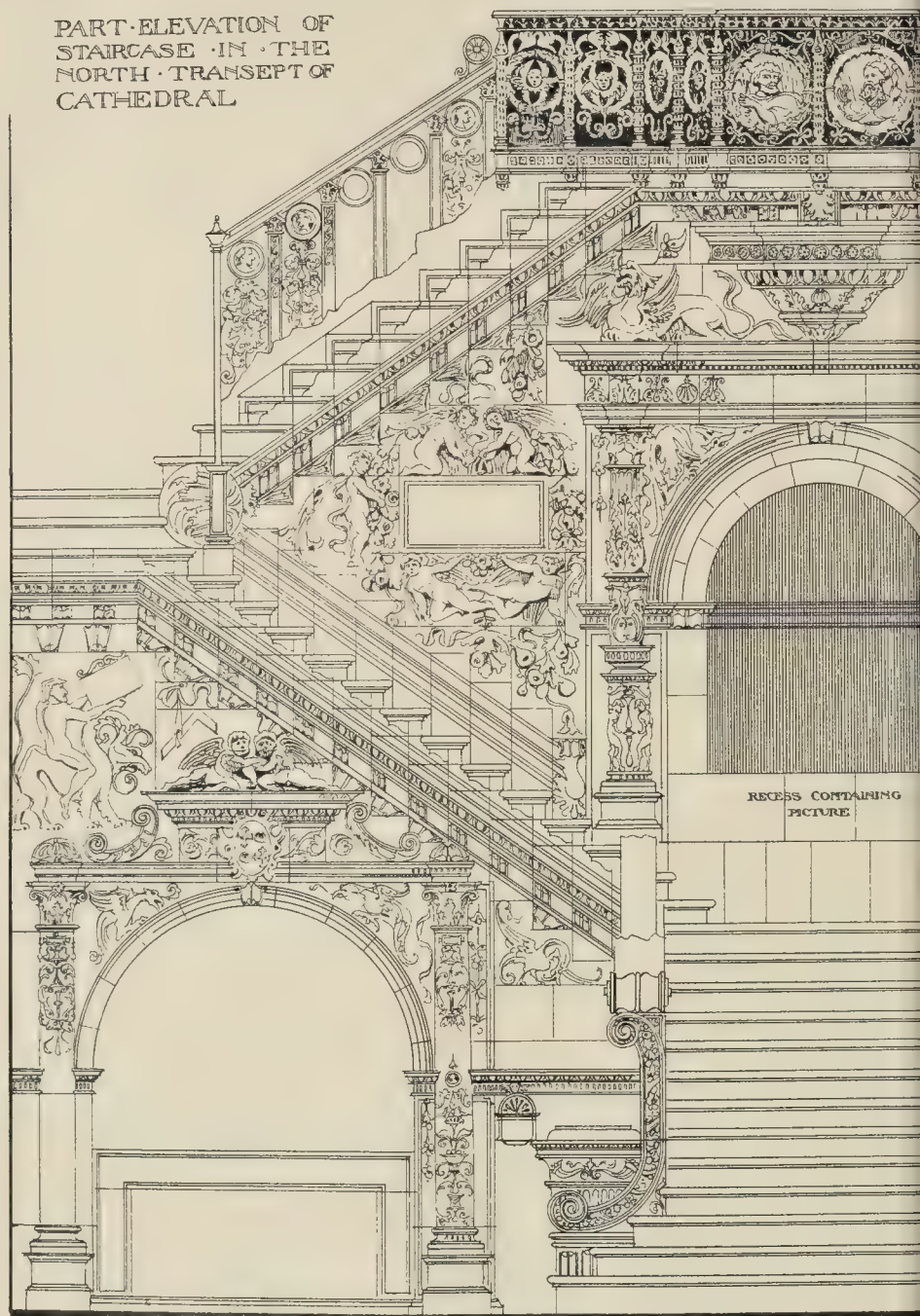
Scale of Feet

W. HEDDERLEY ARCHT.
BIRMINGHAM



BURGOS

PART-ELEVATION OF
STAIRCASE IN THE
NORTH-TRANSEPT OF
CATHEDRAL

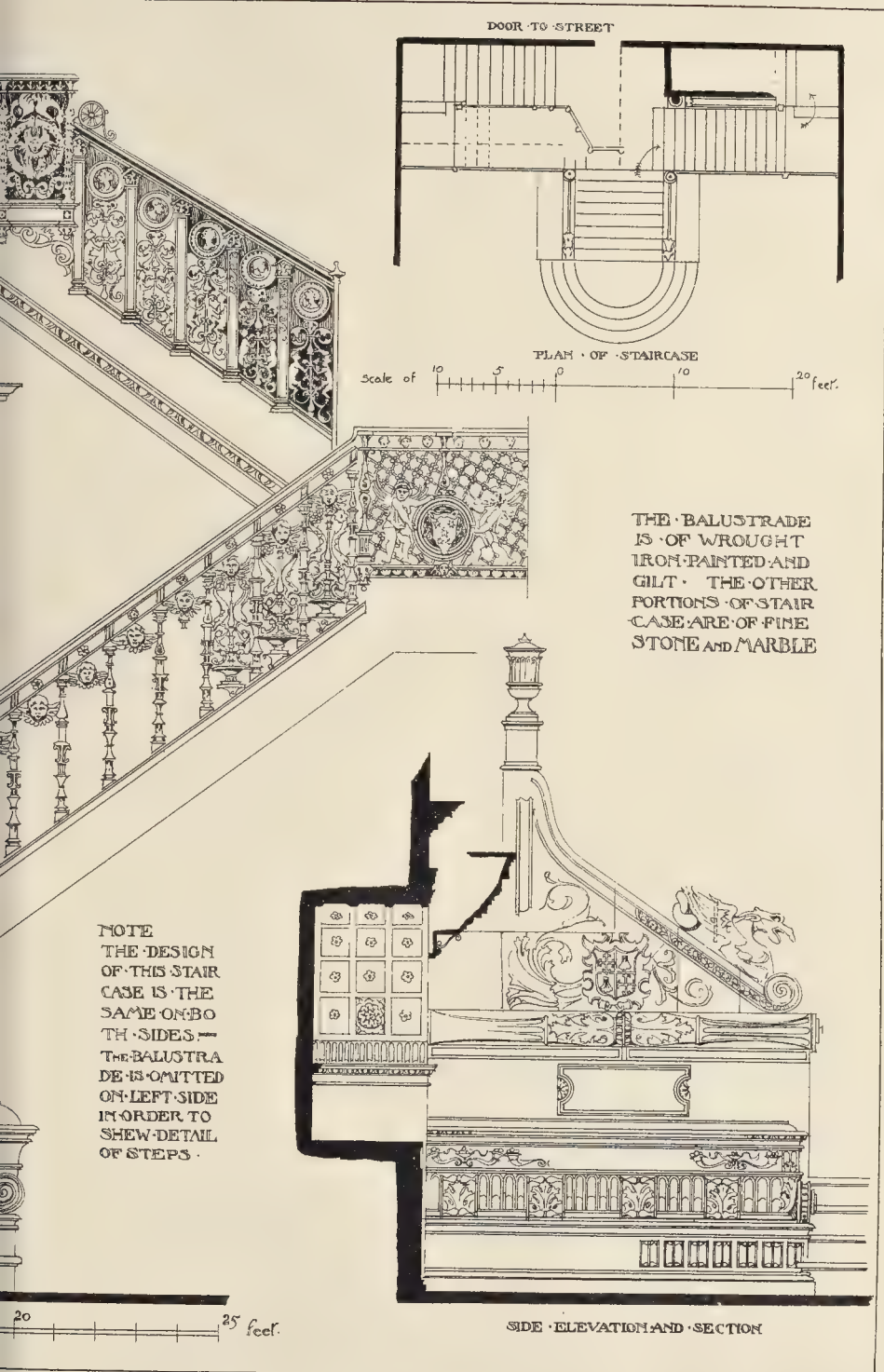


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LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon in the County Hall, Spring Gardens, Mr. John Hutton, Chairman, presiding.

Tendering.—The Main Drainage Committee reported that they had considered tenders for the supply and erection of six new Lancashire boilers and accessories at the Deptford pumping-station. Messrs. A. Anderton & Sons offered to do the work for 3,855*l.* 4*s.* 2*d.*, Messrs. R. Taylor & Sons for 4,051*l.* 3*s.*, Messrs. Yates & Thom for 4,130*l.* 10*s.* 2*d.*, and Messrs. Spurr, Inman, & Co. for 4,154*l.* 0*s.* 2*d.* The report stated that Messrs. Anderton & Sons, the lowest tenderers, had not filled in the schedule of wages, and consequently were disqualified. Under all the circumstances the Committee thought it advisable that the tender of Messrs. Spurr, Inman, & Co. should be accepted, and they recommended accordingly.

Lieutenant-Colonel Ford moved, and Major Probyn seconded, that the tender of Messrs. R. Taylor & Sons be accepted.

Mr. McDougall, the Chairman of the Committee, explained that Messrs. Spurr, Inman, & Co. had on previous occasions carried out similar work for the Council in a satisfactory manner, and as their rate of wages showed an average of between 8*d.* and 9*d.* an hour, as compared with 6*d.* and 7*d.* by other tenderers, and as there was only a difference of some 2*l.* 10*s.* in the amount of their tenders, his committee considered it advisable that their contract should be accepted.

On a division the amendment was carried by 40 to 38.

On the motion of Mr. Hoare the report was referred back to the committee.

Betterment.—The Parliamentary Committee reported that the question of the best means of bringing the principle of betterment before Parliament during the next Session had received the most careful consideration. They had come to the conclusion that the wisest course would be to introduce the principle in its application to the Tower Bridge approach, in connexion with which the cases of betterment (though the amount was not large) admitted of clear proof, and afforded an excellent illustration of the principle. They had also been influenced by the fact that in this form the principle had already commanded the assent of the House of Commons. They therefore recommended:—

"That an Improvement Bill be introduced in the next Session, which shall contain the provisions of the Bill of last year, on the same lines as those on which it passed the House of Commons, with respect to the approach to the Tower Bridge and the application of betterment thereto."

After considerable discussion, the recommendation of the Committee was agreed to, with an addition, moved by Mr. Marsland and seconded by Mr. Saunders, M.P.

The Water Supply Question.—The Water Committee submitted a report, stating that the Royal Commission having now completed their works and issued their report, it appeared to them quite clear that some arrangements must be made without delay for the provision of an additional water supply, and that the Council should be in a position to acquire such areas or lands as might be found to be necessary for the supply of water to the Metropolis. Parliamentary powers would be required for this purpose, and these should, in their opinion, in the first instance, be of a general character, specific and detailed plans being left for subsequent preparation and submission to the Council. The desired object might probably most conveniently be effected by an amendment of the Water Act of 1892, or by a separate Bill to enable the Council to purchase land and water rights by agreement for the purpose of supplying water to the Metropolis, together with powers of supply. They therefore recommended:—

"That the Council do resolve that it is desirable for the Council to obtain powers for the acquisition of such areas as may be needed for the supply of water to the metropolis, and that the Parliamentary Committee be instructed to publish the necessary notices and prepare a Bill for that purpose."

Considerable discussion took place on the report of the Committee, Lord Farrer, Alderman Fletcher Moulton, Q.C., and others, strongly supporting the recommendation, which was ultimately adopted after the insertion of the words after the word "metropolis," "together with power of supply."

Proposed new Theatre.—The Theatres and Music-halls Committee reported that they had

received six drawings from Messrs. Crewe & Sprague of a proposed new theatre at Camberwell. The site, which was at the angle of Denmark-hill and Coldharbour-lane, complied with the regulations of the Council. The theatre, which will contain seating accommodation for 1,053 persons, would be erected on land to be leased from the Council. The drawings were recommended for approval subject to certain conditions to make them accord with the Council's regulations as to exits, staircases, stage construction, and other matters, and this was agreed to.

After the transaction of other business the Council adjourned at 7 o'clock.

THE JUNIOR ENGINEERING SOCIETY.

THIS society opened its thirteenth annual session on Saturday last by a meeting held at the Westminster Palace Hotel.

After the transaction of some formal business, the retiring President, Dr. John Hopkinson, introduced the President-elect for the ensuing year, Mr. John Wolfe Barry, Engineer of the Tower Bridge, who subsequently delivered his Presidential address:—"The Italians were, he said, our early architects and engineers. One of their greatest artists, Leonardo da Vinci, was the inventor of canal locks and the author of a variety of engineering designs. Between the departments of the sanitary engineer and the civil engineer, both developed from the Italian masters, it was not always easy to maintain a clear line of distinction, and in India, particularly, the Royal engineer had invaded the preserves of the civil engineer to such an extent that widespread dissatisfaction existed in the Civil Engineering Staff of the Public Works Department of India, because the Government's promise to keep the two distinct had not been adhered to. Both the past and the present history of the profession showed that the possession of the high moral qualities of courage, bravery, constancy, loyalty, and uprightness was indispensable to the successful engineer. The progress made in engineering science during the past fifty years was illustrated by a comparison of the length and weight of fast trains, the safety of railway travelling, the length and weight of bridges, the dimensions of ship canals, and the speed and size of steamships. In 1844 there were few railway statistics available, but taking those of thirty years ago, the President found that 1 person in 10,000,000 of the population was killed and 3 in 1,110,000 were injured by railway accidents, while in the past three years the proportions had been reduced to one in 56,000,000 killed and one in 1,280,000 injured. Among railway employes the increased safety was not quite so great, but for one killed in 347, thirty years ago and one in 86 injured, there was now only one railway servant in 723 killed and one in 127 injured annually. Highgate Archway had once been called the eighth wonder of the world, and forty years ago the Menai Bridge, with its two spans of 460 ft. and two of 230 ft. was justly so regarded. Compare these with the Forth Bridge, with its two spans of 1,760 ft. each, and the great strides made in engineering construction might be realised. Mention having been made of the great improvement in ocean steamers during the last forty years the President said that sanitary engineering had the same story of progress to show. In 1870 the London death-rate was 24.4 per 1,000, and at present 19.7 per 1,000, the difference representing an annual saving of 20,000 lives. The high death rates still prevailing in many of the great provincial towns like Manchester, Plymouth, Halifax, Salford, Blackburn, and Edinburgh, which were respectively 26.3, 26.8, 26.7, 41.5, 29.9, and 24, proved that a great deal remained to be done in the direction of sanitary improvement. Upon the question of the education required for the profession, Mr. Barry differed from the views of a former President, Dr. Anderson, in holding that education meant not mere instruction but that general exercise of the mind which enabled a youth to put forth his best qualities in the acquisition of special knowledge. With regard to the potentialities of engineering in the future, there was no reason to doubt that in the future as in the past, when we seemed to be approaching the limits of possibility, some new discovery would suddenly open out new and vast fields for the exercise of scientific knowledge. In locomotion enthusiastic investigators promised us railway trains at 150 miles an hour, and road traction independent of animal power. A ship canal connecting the Atlantic and Pacific

oceans he believed would be made before long notwithstanding the unfortunate result of the Panama scheme. The future of ordinary and extraordinary marine monsters and of aerial machines opened up vast possibilities for improvements in mechanical science, and every new development by the mechanicians involved new problems which the constructive engineer would have to solve. Our population and our wealth were still increasing, and there must be an increasing demand for more railways, docks, harbours, bridges, roads and the like. He could see no reason to suppose that this increase would be less than heretofore, though there would, of course, be ups and downs.

A hearty vote of thanks was accorded to the President for his address on the motion of Mr. Sidney Boulding, seconded by Mr. Sydney H. Wells.

ARCHITECTURAL SOCIETIES.

GLASGOW ARCHITECTURAL ASSOCIATION.—The usual monthly meeting of this Association was held in the Rooms on the 7th inst., when a paper was read by Mr. George Hill on "Architectural Problems." The lecturer said that in every age of architecture dilemmas presented themselves. The works of the Greeks, the Romans, and the Medievalists were alluded to as instances of different modes of construction to suit varied requirements. It was for the architect of to-day to familiarise himself with these, and to endeavour to work in the same spirit as his predecessors, so that he might be able to produce results that would be artistic and at the same time suitable. The architectural problems that have to be faced at present are principally connected with the designing of buildings for commercial purposes, notably in the treatment of shop fronts, where a large window area is a desideratum. The lecturer thought that more might be made of iron construction in this respect, and advocated that it should be exposed, maintaining that very good results might be got by this means and quite in accordance with the requirements. A discussion followed, and at the close the lecturer received a hearty vote of thanks.

ARCHITECTURAL SECTION OF THE GLASGOW PHILOSOPHICAL SOCIETY.—The opening meeting of the architectural section of the Glasgow Philosophical Society was held on Monday in the Rooms, 207, Bath-street, Mr. Campbell Douglas, President, in the chair. The Chairman, in his presidential address, discussed the relations of architecture to art. Architecture was not merely correct construction or the designing and building on scientific principles. If that were all, architecture might be merely the product of the builder or the civil engineer. But in architecture there was a mysterious quality which gave the work the dignity of art. It was here that imaginative intelligence displayed its genius. Without intelligence the result was merely mechanical, and without imagination there could not be any individuality, and without individuality work could not be associated with the mind which originated and fashioned it.

ENGINEERING SOCIETIES.

THE INSTITUTION OF CIVIL ENGINEERS.—The inaugural meeting of the seventy-sixth session of this society was held on the 14th inst., Sir Robert Rawlinson, K.C.B., Vice-President in the chair. Owing to the absence, from ill-health, of the lately-elected President, Mr. Alfred Giles, the address prepared by him for delivery on this occasion was, therefore read by the secretary. Claiming the indulgence of his audience on the score that he was the senior of all previous Presidents of the Institution at the time of their election, Mr. Giles proceeded to recall some circumstances connected with locomotion sixty years ago, contrasting the cheapness, safety and luxury of the modern railway, with the danger, discomfort, and expense of even the best lines of stage coaches. Not less striking was the development of the Post Office. In 1831 two mail coaches daily (one going through Newcastle to Edinburgh, and the other through Carlisle to Glasgow), were sufficient to carry the whole of the mails from London to Scotland. Referring to the virtual completion of the English railway system, the President opined that the work of providing like accommodation in the immense possessions of the Empire would yet provide employment for the railway engineer for many years. Turning to steam-navigation, it was stated that in 1810 the first steamer crossing the Irish Channel accomplished the distance of 63 miles from Holy-

head to Dublin in 7½ hours. The same trip is now frequently made in less than 3½ hours. Ocean transport was next considered, special reference being made to the advisability of adopting twin screws for all fast passenger-steamers. High-speed navigation involved special appliances for quickly loading and unloading at the docks, and also considerable extension and enlargement of the docks themselves. It was stated that the new Empress Dock at Southampton had been designed in the shape of a diamond, so as to allow of greater speed in getting vessels to their berths, thus also avoiding the necessity of swinging round at right-angles when passing through the gates. The President then made some remarks on the advantages which would accrue from a simpler procedure in passing private Bills through Parliament, and concluded with a reference to the progress and prospects of the Institution, especially in connexion with the contemplated re-building of the premises. After the reading of the address the premiums and prizes awarded last session were formally presented to the recipients.

LIVERPOOL ENGINEERING SOCIETY.—The second meeting of this society was held on the 8th inst. when a paper entitled "Some English Waterways" was read by Mr. J. A. Saner, A.M.Inst.C.E., who is engineer to the River Weaver trustees. The author, after giving a short historical account of the formation of canals and canalisation of rivers in the United Kingdom, gave the following as being the essential points for the consideration of an engineer when called upon to execute such works:—1. What watersheds has the proposed canal to pass through and where can he obtain water most economically? 2. What route, having regard to existing towns, will give the least number of changes of level and minimum cost of cutting tunnels, &c? 3. What is the most convenient size of boat to be provided for? 4. What size the locks or lifts should be made, and what sectional area the waterway should be? 5. What method, whether locks, lifts, or inclines, he will adopt to overcome the changes of level? 6. What system of towage should be provided for? 7. The cost of construction and the cost of maintenance. 8. Floods. Mr. Saner, in conclusion, gave an account of a "voyage" made by himself in 1891 from the River Weaver to the River Thames *via* the River Severn, in which he passed through portions of no less than six canals in addition to three rivers.

OLD DOORWAY, CAREY-STREET.

This doorway was formerly at No. 18, Carey-street, Lincoln's Inn, but is now in the South Kensington Museum. It is of deal, and was made in the early part of the eighteenth century.

Correspondence.

To the Editor of THE BUILDER.

MANGOTSFIELD SEWERAGE WORKS.

SIR,—I notice in the *Builder* of last week a note of the proposed Sewerage Works at Mangotsfield, wherein it is stated as follows:—"Mr. Nicholson Lailey, representing the firm of London engineers who have prepared plans of the suggested sewerage works, gave evidence with reference to the scheme." As this is, no doubt, a clerical error, I shall be much obliged if you will correct the same in your next issue. The Scheme of Sewerage was designed in my office, and I am in no way representing any firm of London engineers.

C. NICHOLSON LAILEY.

16, Great George-street, Westminster, S.W.

RE "WHAT IS A PUBLIC SEWER?"

SIR,—Your correspondent, "C. H. A." in his letter to the *BUILDER*, October 28 ult., asks if any "cases" have been decided thereon.

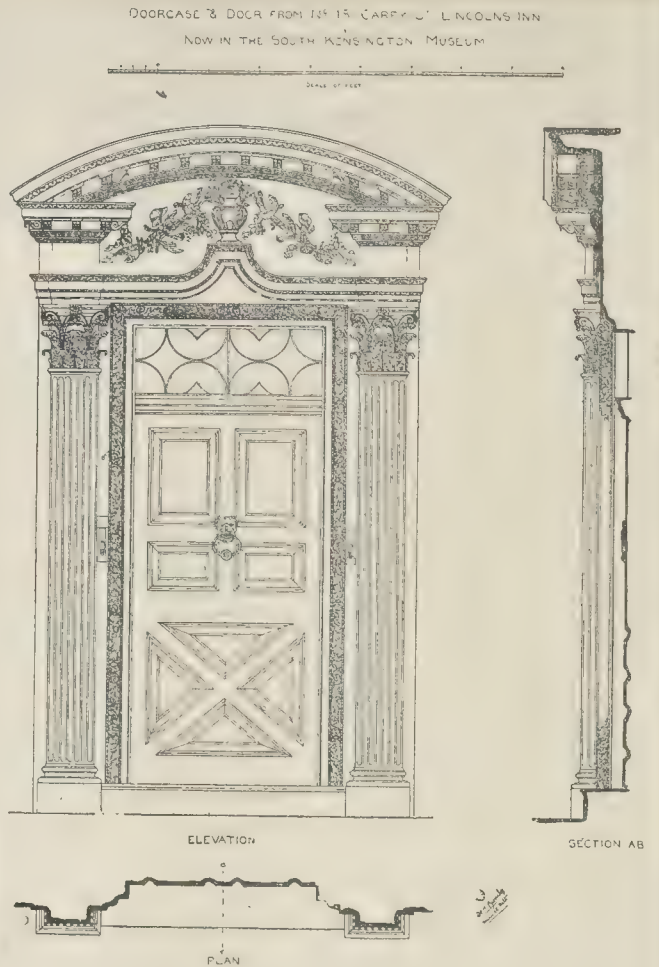
I refer him to a case, Bateman and another v. The Poplar Board of Works, which is reported in the *Times* of May 19, 1886; also in the *Law Reports*, &c., see "Digest" of Reports for 1886 to 1890; also in the *BUILDER*, but I cannot give the date.

I was the principal witness for the plaintiff, and have full details (and plans) of the case in my possession if your correspondent would like to inspect same.

RICHARD M. HISCOCKS.

58, Haselridge-road, Clapham, S.W.

P.S.—This case came before the Court of Appeal, July 30, 1886, when Justices Cotton and Lindley decided that it was a *private drain*, but Justice Lopes was in favour of the plaintiff, and considered it a *public sewer*, &c. The above case is exactly similar to your correspondent's.



The Student's Column.

GEOLOGY.—XXI.

BUILDING SITES.

WHAT geology has unconsciously played a very important rôle in determining the sites of ancient settlements is now generally acknowledged. The dwellings of early inhabitants in this country must have been confined to those formations and situations unfavourable to the growth of trees, where open expanses of turf for pasture were to be found, and where suitable stones for tool-making could be procured. All these conditions are to be found on Chalk downs, though not confined to them; there we find the remains of ancient settlements, and evidence is not wanting that many spaces have been cultivated.

After settlements came towns and villages. Mr. Topley states that the face of the Chalk escarpment around the Weald of Kent and Sussex is divided amongst 125 parishes, 119 of which lie beneath the escarpment and on its slopes, whilst only six are confined to the Chalk above. He considers that the latter were the earliest settlements. On the plateau where there is no drift, he says, all was turf, and there are found abundant Celtic remains. Later on, at the foot of the escarpment numerous villages were built, most of them on the Upper Greensand, and we find the parish extending from the Gault Clay up the scarp; so that each village had its due share of pasture (Chalk), arable (chiefly Upper Green-

sand), and woodland (chiefly Gault). These points are clearly shown in the diagram (fig. 1).

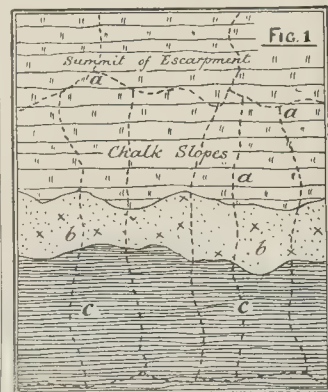
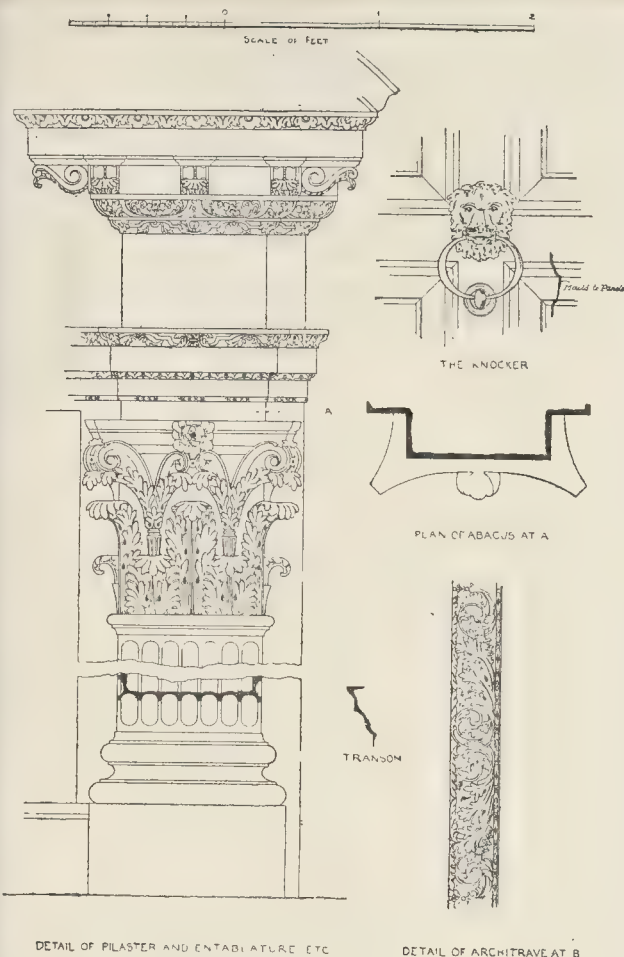


Fig. 1.—Map showing the influence of Geological Structure on the Boundaries of Parishes.

a. Chalk. b. Upper Greensand. c. Gault Clay. d. Parish boundaries. X.—Villages.

The villages would obtain their water supply from springs at the junction of the Chalk and Upper Greensand.

* F. J. Bennett, "Proc. Geol. Assoc.," vol. x. (1887-8), p. 37.
† W. Topley, "Journ. Anthropological Inst.," vol. iii.



Measured and drawn by Mr. H. T. Bromley.

Mr. Bennett remarks that generally throughout England in the wide areas of the clay formations, no towns or villages were to be found where the clay alone was to be met with, but where beds of sand and gravel capped the clay their occurrence decided the sites of the communities as being places where water could be found, so that the mere presence of the old towns and villages would indicate the spots where water-bearing strata existed. The extension of towns too has frequently been influenced by the distribution of gravel beds in their vicinity. Professor Prestwich has pointed out with reference to London, for instance, that in the Middle Ages the chief extensions took place on the gravelly soil, and it is known that prior to the existence of the London water companies, extensive clay tracts were bare of houses.

An interesting case is cited by Mr. Topley in the memoir previously alluded to, where he states that in the eastern part of Northumberland which is much covered with drift deposits, chiefly Boulder Clay, there rise up in many places isolated areas of sandstone belonging to the Coal Measures and Millstone Grit formations. On these rocky patches most of the ancient villages and the more important hamlets were built. Here the soil is dry and springs occur at the edge of the clay formation. The sites of these old settlements were determined by the distribution of the surface soil.

Coming, now, to more modern times we may say that the selection of building sites from a geological point of view is governed by two primary considerations—(1) the character of the

soil in relation to the health of the prospective inhabitants of the dwelling, and (2) the structure of the ground in its bearing on foundations and stability of the building.

Building Sites in their Relation to Health.—To adequately discuss this phase of the subject we should have to introduce a considerable amount of medical evidence, which it is not our present purpose to do. All that we can now attempt, is to state a few general principles on which the relation of soil to health is based.

It is much to be regretted that so little has hitherto been done in accurately ascertaining the induction or fostering of disease by geological surroundings; here and there spasmodic efforts relating chiefly to some specific form of disease have been made, and these are of undoubted value in a limited sense, but something more is required. Certain authorities believe that sufficient light has already been thrown on the subject as a whole to enable them to make generalisations, but we feel sure that much yet remains to be accomplished before even the outlines of this section of the science can be firmly established. A considerable amount of information is derived locally from the inquiries instituted by the Local Government Board from time to time, but these are too frequently unaccompanied by evidence from others than medical men, the district surveyor, and local magnates—whose knowledge of geology is often shadowy in the extreme—to be of much permanent value. Where a careful investigation is backed up by a report from a really competent geological surveyor, however, we sometimes get interesting matter, which, taken with other cases and properly

digested, is useful enough. Even where a report of this nature subsequently turns out to have no practical bearing on the subject under examination, it was necessary to be assured on that point.

Although so little has been done in determining the sites of dwellings from the point of view of health, we think the following is fairly well established:—

1. Alluvium, or marshland of streams and creeks is not a healthy site, both from its extreme lowness and from its otherwise damp character.
2. Clay land, especially when wet, is not to be recommended, its dampness leading to rheumatism, &c.
3. Gravelly soil is both healthy and unhealthy, depending on circumstances. Where it is tolerably thick (a few yards) and dry, it is healthy; on the other hand, where it is thin, and rests on clay, or is permeated by water it is unhealthy.
4. Loam, *i.e.*, sand mixed with a fair proportion of clay, is not a desirable site from the point of view of health, though if thin and resting on dry gravel it is fairly good.
5. Limestones and hard calcareous rocks generally form healthy sites, though care should be exercised in limestone valleys to select a spot where the foundation is not water-logged. We may also utter a word of caution in regard to the latter point. The water level in such rocks as limestones varies with the rainfall of the district; an apparently dry situation at certain times of the year may thus become very wet for months together.

6. Sandy beds, especially when in an elevated position, form healthy enough sites.

7. Sandstone, granite, or slaty rocks are usually healthy except when in a highly decomposed state, when they pass into loam, clay, &c.

Where dependent on water drawn from wells, or supplied naturally by gravitation from the hill-side, all other things being equal, the building should, if possible, be erected where the water is only of moderate hardness, remembering that very hard water induces calculous diseases, whilst it is not economical for household purposes. On the other hand, if water is too soft it possesses considerable solvent power, and under certain circumstances this might lead to mineral poisoning; moreover, it propagates disease germs more readily than does hard water.

Proximity to cemeteries is another point for consideration. Where the sites of burial grounds have been ill-chosen, *e.g.*, on the slope of a hill in a porous formation of little thickness, the contaminated water therefrom sometimes finds its way to the stratum from which the village below derives its water. How often do we see the village pump or cottager's well in the immediate vicinity of the churchyard?

Low ground, composed of clays, and where floods are frequent, favour high mortality; but on high ground of calcareous rocks the mortality is very low. These remarks especially apply to cancer and the like. It has been said that in the history of disease, clays are connected with the most deadly scourges to which the human race has been subjected; limestones have no such appalling record.

Probably the most healthy site for building purposes is on dry gravel soil of moderate thickness, and in an elevated position.

SURVEYORSHIPS.

PENARTH.—On Monday a special meeting of the Penarth Local Board was held to elect a surveyor in place of Mr. James Court, the present surveyor, who had held the office for eight years and a half, and who recently was requested to resign. There were 200 applications, the following four of whom were first selected:—Messrs. Berkenhead, Bull, Evans, and Hawksley. Mr. Court's name was now, however, added, on the motion of Mr. R. Bevan, seconded by Mr. W. Coles, with the result that Mr. Court was re-elected.—*Western Mail*.

REREDOS, LOOE PARISH CHURCH, CORNWALL.—A new reredos has just been dedicated at Looe Parish Church. It was designed by Mr. Edwin I. Munk, of London, the architect from whose designs the church was built in 1883. The reredos is composed of polished variegated English alabaster and beerstone. It consists, in the main, of three compartments, surmounted by moulded and carved canopies, upon the panels beneath being sacred monograms cut in the solid. These are flanked on either side by pinnacles and finials supported by alabaster columns and moulded caps. The work has been carried out by Messrs. Harry Hems & Sons, of Exeter.

GENERAL BUILDING NEWS.

ALTERATIONS, GRAY'S INN.—Further alterations are about to be made at the Inn, under the superintendence of Mr. Isaacs, the Society's Surveyor. New chambers and class-rooms will be erected, facing the garden, at the open end of Gray's Inn-place, where the site of one of the two small houses is now being cleared by Mr. Howell J. Williams, contractor; and the Benchers have decided, it is said, to spend about 2,000*l.* in substituting an ornamental railing for the high wall which screens the garden from Theobald's-road. There is good reason for belief that Gray's Inn-gardens, once a favourite resort of persons of quality, were laid out under Bacon's own direction. The books contain entries for the years 1597, 1598, and 1600, of payments made to him for disbursements in respect thereof. In 1600 he set up a summer-house (pulled down, together with some of the trees, one hundred and fifty years later) in memory of Jeremy Bettenham, a Reader of the Inn, whose executor he was. Spedding says that here Raleigh just before starting on his last ill-fated voyage to America, had a long discourse with Bacon, for whom he may possibly have brought the catalpa tree which, tradition says, the latter planted in the garden, near the wall about to be removed. It is expected that the chapel will be ready for re-opening early next year; the completion is somewhat delayed by the casing and strengthening of the walls with new brickwork, which has been found to be necessary.

WESLEYAN CHAPEL, MARAZON, CORNWALL.—Foundation stones of a new Wesleyan Chapel were laid at Marazon on the 1st inst. The building is to cost about 2,000*l.*, and will be 60 ft. long and 45 ft. wide, with seating accommodation for 550 persons. It will be in the Gothic style, and, in addition to the main building, provision has been made for the necessary vestries and usual offices. The front will be of granite, relieved by mouldings, and the main entrance, which will be elevated from the level of the street, will open into a large lobby. The plans have been prepared by Mr. R. Pascoe, of Marazon, and the contract has been let to Mr. George Miners.

PARISH CHURCH, TROON, AYRSHIRE.—The memorial stone of a new parish church for Troon has just been laid by the Duke of Portland. The new building will be of Gothic design, and the main approach is from Ayr-street. The plan is of cruciform outline, comprising—nave, 88 ft. by 36 ft. in width, with side aisles each 5 ft. wide; transepts each 31 ft. wide and 19 ft. deep; choir, 26 ft. wide and 16 ft. deep, with organ accommodation about 14 ft. wide and 11 ft. deep. The accommodation of the area is supplemented by galleries in each transept, and also over the vestibule at the entrance end of the nave, separate staircases being provided therefor. At the outer angle of the building a tower is placed, designed to be 180 ft. in height. The group of buildings when complete will comprise, in addition to the church, a vestry, session-room, retiring-room, and large hall, the whole being so arranged on plan as to form a kind of cloister-court on one side of the church. In the interior, the nave is divided into a series of bays by stone shafts, with moulded bases and capitals, from which spring moulded arches of stone. The arches at the transepts are raised much higher. The roofs will be of barrel-arch outline internally, finished with stained pine lining, and relieved at intervals with moulded ribs. The external height of the building to the ridge is 62 ft., while the height of the front gable to Ayr-street is 70 ft. The transept gables are designed in harmony with the main gable. The work is being carried out with red stone from Montgomery Quarry for both exterior and interior work. The cost is estimated at about 10,000*l.* The architect is Mr. Hippolyte Blanc, A.R.S.A.

NEW NAVE, ST. MARY MAGDALEN CHURCH, HARLOW.—The new nave of the Church of St. Mary Magdalen, Harlow, was dedicated on the 1st inst. The nave, which was designed by Mr. Ewan Christian, has been built by Mr. William Wade, of St. Neots, Huntingdonshire. The building is in the Perpendicular style, and has a slated roof. There are eight Gothic windows of cathedral glass in the nave, three two-light windows and one three-light window on the north side, two two-light and one three-light windows on the south side, and one four-light window at the west end. The interior of the nave is 54 ft. long and 24 ft. wide, and the entrance is at the south-west corner, where the foundation of the tower has already been laid. The main entrance to the church will thus be through the tower when completed. The nave, which is capable of seating 150 persons, is paved with wood blocks, diagonally laid, except in the centre, which is paved with red glazed tiles. The roof is of deal.

RESTORATION OF WRAXALL CHURCH.—The parish Church of All Saints, Wraxall, Somersetshire, has just been re-opened after restoration. It was found that the south wall of the chancel was as much as 9 in. out of the perpendicular, and that other portions of this part of the structure were in a state which necessitated attention being paid to them, and it was therefore decided to restore the building. The chancel has been practically rebuilt. The north wall has been reconstructed, and the south chapel extended towards the east; the roof of the chancel has been raised. The restoration has been carried out in accordance with designs prepared

by Sir Arthur Blomfield, of London. The church itself is Early English, and the chancel has been restored in the Perpendicular style.

METHODIST CHURCH, BALLYNAFFRIGH, BELFAST.—On the 3rd inst. a new Methodist church was opened in Ballynafrigh. The building is 65 ft. in length by 32 ft. wide. It is constructed of corrugated galvanised iron, sheeted in felt, and lined with matchboard. The windows are of cathedral leaded lights, and the roofing timbers are of pitch-pine. The seating arrangements provide accommodation for 310 adults. The foundation and builders' work was done by Mr. Lowry, and the superstructure was erected by Messrs. Humphreys & Co., of Knightsbridge, London, under the superintendence of Mr. J. J. Phillips, architect, Belfast.

CHURCH OF ENGLAND INSTITUTE, NEWCASTLE.—The old Central Hall, in Hood-street, Newcastle, has been transformed into the new Church of England Institute, and the premises were opened a short time since by the Bishop of Newcastle. The interior has been completely reconstructed. The library, which is the main room on the ground floor, is T-shaped, and measures 47 ft. by 25 ft. At the far corner is a spiral iron staircase leading to the main hall above. Adjoining the library, near the entrance, are four smaller rooms, two on each side. One of them has a lift communicating with the basement. From the vestibule a double staircase leads to the main hall. This has been made by constructing a new floor, nearly on a level with the gallery of the old hall. The necessary height has been obtained by removing the old ceiling and carrying the room right up to the roof. This, the main hall, is 48 ft. square, and has, in addition, a gallery. Seating accommodation is provided for 430 in the area and 172 in the gallery. There is a retiring room on either side of the platform. On the same level as the main hall there are two retiring rooms and lavatories for ladies, and these are connected by a balcony which overlooks the main stairway. The old under-hall, which may be entered either from the library or from the street, is being converted into a gymnasium. The basement has been lowered 3 ft., the height of the hall now being 15 ft. Adjoining the gymnasium are a small refreshment room, a dressing room with shower baths, a scullery with tea boilers, and a heating cellar. At the far end, a stairway leads to the gentlemen's lavatories, which are also connected with the library. All the rooms will be lighted by electricity and warmed by hot-water pipes. The architects of the new Institute are Messrs. Hicks & Charlewood, Newcastle; the contractor is Mr. Robert Veitch, Newcastle; the heating apparatus has been supplied by Messrs. Dimming & Cooke; the electric light fittings by Messrs. J. R. Charlton & Co., and the stained glass by Mr. G. J. Baguley.

HOTEL, BLYTH, NORTHUMBERLAND.—A new hotel has just been opened in Northumberland-street, Blyth. The new building is a three-story brick building, with terra-cotta facings, and has a frontage of 68 ft. The main entrance consists of a large porch, laid with small mosaics. On the ground floor are situated two furnished bars, kitchen, larder, news-room, smoke-room, and lavatories. The public bar is 45 ft. in length. Access to the rooms on the first floor is obtained by a wide staircase. The dining-room is 30 ft. by 20 ft., and there is also a star-chamber and a county-chamber. Adjoining the dining-room is a commercial-room. The fire-places are of marble, with hand-painted tiling. The billiard-room is also situated on this floor. A suite of bedrooms is on the next story. Throughout, the hotel is fitted with speaking-tubes and electric bells. In addition to a cellar, there are wash-houses, coach-houses, and stables situated at the rear of the building. The total cost was 10,000*l.*, and the building has been erected by Messrs. J. & W. Simpson, of Blyth, from the plan of Mr. J. T. Cackett, architect, of Newcastle and Blyth. Mr. W. Armstrong, Blyth, was contractor for the painting; Messrs. Sanderson & Co., Blyth, plumbing; and Messrs. Laidler & Co., Newcastle, the decorating.

LADS' CLUB, DENTON, LANCASHIRE.—On the 4th inst. a new lads' club was opened at Denton. The building was designed by Mr. J. W. Beaumont, architect, Manchester, and consists of four classrooms together with the secretary's office on the ground floor, and a reading-room and two game-rooms on the upper floor. The kitchen and rooms connected with it are in the basement. Attached to the clubhouse is a gymnasium about 65 ft. long by 45 ft. in width, roofed with plain iron, and provided with two large and three small dressings-rooms, and lavatories and baths. Up to the first story the structure is in brick, the rest of the upper story being of framed timber filled in with plaster panels, while the roof is of red tile. The club and gymnasium are fitted up with the electric light.

NEW CHURCH AT SOUTH BANK, YORKSHIRE.—The foundation-stone of a new church, to be known as St. John's, was laid at South Bank recently. The site is at the corner of Redcar-road and Normanby-roads. The church will have plain lancet-headed windows, and will depend entirely upon its outline for effect, as no ornamentation is possible owing to the want of funds. The contractors for the whole of the work are Messrs. Allison Brothers, of Middlesbrough. The architect is Mr. J. Mitchell Bottomly, of Middlesbrough.

THE RESTORATION OF DUNBLANE CATHEDRAL.—There was a special service in Dunblane Cathedral on the 28th ult. on the occasion of the completion of its restoration. The present restoration was begun some years ago, and was entrusted to Dr. Rowand Anderson, architect, Edinburgh. The architect, in carrying out the restoration, has repaired and renewed only where structurally necessary. The wall heads having been repaired, the new roofs were put on; these are all of oak. The minor repairs consisted chiefly of cutting out parts that could no longer hold together, and repairing them with sound and new stone, repairing the gable tops and skewes, and repairing the walls where there appeared any signs of weakness. Some parts had to be taken down and rebuilt, using again the same material where sound; this was necessary to get the roofs to fit, and also because considerable masses had been displaced but not overturned by vegetation. The whole of the building having been roofed in, and the windows glazed, the soil and vegetation on the area of the floor were removed, but not before a plan had been made showing all the graves. The whole area was then concreted and asphalted, the finished floor of the nave being composed of red, yellow, and black freestone laid in various patterns. The floor of the choir is of tiles and marble. All the gravestones have been replaced. Mr. George Kerruish has acted throughout as clerk of works. In the course of the operations many monuments have been dealt with, and steps have been taken to ensure, as far as possible, their preservation. The scheme of the chancel screen is the Law and the Prophets.

NEW CORONER'S COURT, WESTMINSTER.—On Monday were opened the new coroner's court, public mortuary, and other buildings, erected by the Vestry of Westminster in the Horseley-road, Westminster. The elevation of the building is of red brick and Portland stone dressings, and is in the Renaissance style. The entrance hall is approached through a porch and folding-doors, and leading off therefrom are an office, caretaker's apartments, and a staircase of Victoria stone with ornamental iron balusters. The first floor consists of the coroner's court, coroner's private room, jury room, and women's retiring room. The coroner's court, which is 33 ft. by 15 ft. wide and 15 ft. high, has an open roof with cove ceiling. The dado is of panelled walnut, and the floor is laid with Australian karri wood. Light is obtained from the roof and stained glass windows at either end. The heating arrangements are carried out on the Grundy principle, and provision is made for ventilation. The second floor, which is approached by a separate staircase from the north-east side, consists of five rooms, bath-room, &c., and is planned to accommodate families temporarily displaced during the fumigation and cleansing of their dwellings. The mortuary is approached from the side of the coroner's court, and is lighted entirely from an open timber roof. The walls are of cement with glazed brick dado, and the floor is asphalted. The post-mortem room is fitted with the requisite apparatus, and an isolation room, with separate entrance, is provided for cases in which death has been caused by infectious diseases. Detached from these buildings are premises and appliances used for the purpose of disinfecting clothing, &c. A Washington Lyon steam disinfecter and vertical boiler is provided. The building was designed by the Vestry's Surveyor, Mr. G. R. W. Wheeler, and has been erected by Mr. N. Lidstone, of Finsbury Park, Mr. A. Mann, acting as clerk of works. The total cost of the building, including fittings, &c., has been about 6,000*l.* The building is lighted by gas, the lamps being supplied by Messrs. Sugg & Co. The site was given by the Duke of Westminster.

COUNTY BUILDINGS FOR SURREY.—On Monday the new County Hall for Surrey was opened at Kingston-on-Thames. The new buildings were commenced at the end of 1890. They are situated upon two acres of ground facing Grove-road, and have a total frontage of 170 ft. and a depth of about 100 ft. They are built in the style of the Renaissance, from plans prepared by Mr. Howell, the County Surveyor. The buildings are faced with white Portland stone, and bear the arms of the county and other carved work. The main entrance is immediately under the clock tower, which is surmounted by a cupola supported by four columns. The entrance opens into a large hall, supported by columns of polished granite, and to the right and left are the offices for the Clerk of the Peace and the Council, the County Treasurer, County Medical Officer, County Surveyor, and other officers. There is also a fireplace room on the ground floor for the county records, and several cells, capable of accommodating twenty or more prisoners at quarter sessions or assize. A wide stone staircase leads from the lower hall to what is called the great hall, an apartment 60 ft. by 28 ft., with pillars of marble and Venetian windows. A corridor to the left leads from this hall to the court, which is 48 ft. by 33 ft. Surrounding the court are rooms for grand and petty juries, male and female witnesses, counsel, and officials. The council chamber is situated on the opposite side of the building. There are a large number of other rooms which will be used for various purposes, and on the second floor are the kitchen and the apartments of the caretaker. The building is fitted throughout with the electric light, which will be supplied

the new works now nearly completed by the Kingston Corporation. The cost of the building and furnishing is between 50,000l. and 60,000l. The marble mosaic pavements were laid by Messrs. Burke & Co., of Newman-street, London.

UNDERGROUND CONVENIENCE, KNIGHTSBRIDGE.—On Monday an underground convenience, erected in Westminster Vestry, was opened at Knightsbridge. It is situated at the junction of the Knightsbridge and Brompton-roads, near the north end of Sloane-street. Provision is made both for men and women, with separate entrances. In the men's compartment, which is approached by a 4 ft. 6 in. Yorkstone staircase, are six water-closets, fourteen urinals, a lavatory and attendant's room. The water-closets are of the pedestal pattern, and fitted with mahogany seats, and iron flushing tanks, &c. The partitions, doors, and the whole of the other woodwork are of varnished Columbian pine, the doors having penny-in-the-slot locks. The urinals are of round earthenware backs, with polished rouge royale enamel divisions and caps, and two marble and glass tanks are fixed for flushing them. The lavatory contains three basins. The division walls are of brickwork, surmounted with glazed framing. The women's compartment contains five closets, a two-basin lavatory, and an attendant's room. The whole of the brickwork is glazed and the outside walls are of granite. The drains are of glazed pipes, and is provided with a manhole at each portion into which the drains from the closets, lavatories, &c., run separately. The floor is of concrete, overlaid with mosaic paving, and the roof is of glazed lights and ventilating gratings let into stone kerbs and supported on iron girders. The whole has been constructed by Messrs. Doulton, of Lambeth, at the cost of 15,000l., according to drawings, specifications and conditions prepared by the Vestry's Surveyor, Mr. G. R. W. Wheeler, A.M. Inst. C.E.

BOARD SCHOOL, RAWMARSH, YORKSHIRE.—On the 10th inst. a new school for the Rawmarsh School Board was opened at Ryecroft. The school is built of brick with stone dressings. There are two class-rooms and a large room, with cloak-room and lavatory. Mr. Joseph Platts, Rawmarsh, was the architect, and Mr. George Pugh, builder. The total cost, including land, was 2,697l.

POST OFFICE, AYR.—The new Post Office, Ayr, has just been completed. The building, situated at the head of Sandgate-street, is in the Scottish Baronial style, from designs by Mr. W. W. Robertson, Surveyor for Scotland to H.M. Board of Works.

PROPOSED SANATORIUM, CANTERBURY.—The Canterbury Town Council, at the meeting on the 7th inst., decided to purchase two acres of land for the purpose of erecting a sanatorium, the plans and specifications for which have been prepared by Mr. Frank Baker, C.E., City Surveyor.

SANITARY AND ENGINEERING NEWS.

UTTOXETER WATERWORKS.—These works are now completed so far as the Bramhall part of the scheme is concerned, and water is now being supplied to consumers. A covered service reservoir to hold 50,000 gallons has been built. New mains have been laid throughout the town, and all the old fittings connected with the old waterworks have been replaced, and replaced with new. The total cost of the works has been 7,792l. 2s. 11d., and the extras on the general contract only amounted to 22l. 12s. 8d. So many persons asked for the water during the construction of the works that the local authority find themselves with an income of over 400l. a year on the completion of the works, and applications for water are still coming in. The scheme has, therefore, proved a financial success. The engineer previously advised that the Bramshall springs would not prove sufficient for the consumers, and the authority have, therefore, decided to take steps to bring a further supply of water from the Somershall springs, which lie about 3½ miles from the town. The engineer to the scheme is Mr. W. H. Radford, C.E., of Nottingham.

PROPOSED PIER, ABERGEE, DENBIGHSHIRE.—A meeting was held at Abergree on the 4th inst. to consider the advisability of constructing a pier at Abergree. Mr. John J. Hammond, architect, of Rhyl, presented a plan of a pier, which he proposed should be 750 ft. in length and 12 ft. in breadth, with a toll-house on the shore, and a landing jetty at the seaward extremity. At its tip there would be 10 ft. of water at the pier-head. A resolution was passed in favour of the formation of a company.

STAINED GLASS AND DECORATION.

ALTAR CROSS, ST. MARK'S CHURCH, NORFOLK.—MR. W. D. GREEN.—An altar cross was recently dedicated at St. Mark's Church, Noel Park, Wood Green, by the Bishop of Reading. It was designed by Mr. Rowland Plunbe, architect, and it is in solid polished brass. It is about 4 ft. in height, and is symbolical of the Apostles SS. Matthew, Mark, Luke and John, and on the base is the winged Lion of St. Mark's, in duplicate. The cross was manufactured by John Warner & Sons, London.

MEMORIAL WINDOWS, GLASGOW UNIVERSITY. On the 4th inst. the stained glass windows presented to Glasgow University in memory of the late Alexander B. McGrigor, LL.D., were unveiled in the Bute Hall. The windows, which are from designs by Mr. Burne-Jones, R.A., have been executed by Messrs. William Morris & Company, London. They occupy the centre of the west wall of the Bute Hall. There are eight figures in the upper lights representing the great classical poets—Homer, Æschylus, Virgil, Horace, Dante, Chaucer, Shakespeare, and Milton; and in the lower lights are the figures of the patron saints of the United Kingdom—St. George, St. Andrew, St. Patrick, and St. David. There is a foliage background. In the cinquefoil light above is the figure of an angel.

MEMORIAL WINDOW, CHURCH OF ST. KATHERINE, CANVEY ISLAND.—A memorial window has just been placed in the Church of St. Katherine on Canvey Island, near Southend-on-Sea, to the memory of the late Mrs. Thomas Noton, jun. The window was designed by Mr. C. A. Nicholson, the Tithe Prizeman of the Institute of British Architects.

FOREIGN AND COLONIAL.

FRANCE.—As it was unfortunately only too easy to foresee, the sub-committee on the site for the 1900 Exhibition has definitely selected as a site the Champ de Mars, the Trocadéro, the Quai d'Orsay, the Esplanade des Invalides, the Quai de la Conférence, the Cours la Reine, the Palais de l'Industrie, and the adjoining land between its longitudinal axis (prolonged) and the Avenue d'Antin and Cour la Reine. The same committee, which has been very unanimous in its action, has also taken into consideration the provision of the necessary connexion between the two banks of the Seine, and especially the construction of a large bridge opposite the Hôtel des Invalides. In order to satisfy the claims of the quarters situated in the east of Paris, fêtes and meetings will be held simultaneously in the neighbourhood of Vincennes. Lastly, rapid and economic communication between the site of the Exhibition and the various quarters of the capital is to be secured by the construction of branch lines from the principal terminal stations. It is probable that the central committee, presided over by the Minister of Commerce, will ratify this decision, the disadvantages of which have been already pointed out in our columns. A new Synagogue has just been inaugurated in Paris, in the Rue Cadet. M. Louis Bonnier, architect, of Paris, has obtained the first premium in the competition opened at Issy for a Hôtel de Ville; the second prize has been given to M. Bichoff, the third to M. Renault. At Issy-les-Moulineaux, last Sunday, the monument was inaugurated to the memory of the soldiers of the district who fell in the war of 1870-71, in defending the fort built upon the debatable territory of the Commune. The monument is designed by M. Brouard.

The jury of the competition among painters opened by the Conseil Général de la Seine for the decoration of the Salle des Fêtes of the Mairie of Baguelot, has selected the sketch designs of MM. Bérout, Rachoud, and Pierre Vauthier, who will compete again, with finished drawings, for the final decision. The result will be known in February next. The work on the aqueduct which is to convey the sewage of Paris to the Plain of Achères is in active progress. The metallic portion of the bridge over the Seine at Argenteuil will be fixed shortly. The new bridge over the Seine at Juvisy will be soon completed, and is expected to be in use for the public next spring. The pupils of the French School at Athens have found in the excavations at Delphi a marble plaque on which is engraved a hymn to Apollo. Above each syllable are signs which are supposed by some to be part of a musical notation. The designs of the artists who have competed for the Orleans Cathedral windows are at present on exhibition in Orleans. The town of Marseilles intends to erect a monument in honour of the sculptor Puget, on the quay of the old harbour, opposite the Cannebière. The Minister of Public Instruction has just inaugurated a new theatre at Verdun, which has been built under the direction of M. Chénivière (architect). The ramparts of Perpignan will shortly be demolished by the military engineering department. A competition is to be opened at Nérès-les-Bains (Allier) for the construction of a hot-baths establishment. M. Mercier has just finished the model for the monument of the defence of Châteaudun. The town is represented by a young woman, wounded, holding a revolver and couched on a barricade at the feet of a soldier who is pointing his musket at the enemy. Behind the barricade is the dead body of a franc-tireur. The death is announced, at the age of forty-six, of M. Henry Geyler, architect, a former pupil of M. Daumet. He died at the lunatic asylum at Vauluse. M. Roty has been commissioned to execute a medal in commemoration of the bringing of the waters of the Aveyre to Paris.

BELGIUM.—According to the *Belgian News* the restoration of the Laeken Palace is expected to be completed by the beginning of next year. The building has for some time been in the hands of the decorators. The new "Royal Chapel" conservatory at Laeken, which had to be entirely recon-

structed on account of some error in measurement, is now completed. The difficult task of placing the splendid ruins of the Abbey of Villiers in such a condition as to preserve them from further decay is being carried out by M. Licot, who has devoted several years to studying their details. An exhibition of the works of the well-known Swedish painter, Smith-Hald, will shortly be opened at the Brussels Circle Artistique. The Silverton India Rubber Company opened their first Electric Light Supply Station at Brussels on the 9th inst. This is the first public supply station of the kind in Brussels. M. Devreux was the architect to the works. The Archeological Society at Brussels is arranging an exhibition of manufactures prior to the year 1830. It is to be opened in the Christmas week. The historical Hôtel Ravenstein, which is the home of the Society, will be the scene of the exhibition. Notwithstanding the inclement weather rapid progress is being made with the Antwerp Exhibition Buildings. Canada proposes to be an important exhibitor, and has taken an area of 2,500 square metres. The extensive alterations in the Avenue de Kayser have now been completed, and are a great improvement to this thoroughfare.

MISCELLANEOUS.

BUILDERS' WORK AND THE LONDON SCHOOL BOARD.—At the weekly meeting of the London School Board, held on the 9th inst., at the Board-room, Victoria Embankment, a deputation attended from the London Building Trades Federation and presented the following memorial:—"1. That the recognised minimum rate of wages for the building district has not been adhered to by the builders doing the Board's work. 2. That the Board should insist on all contractors tendering for the Board's work supplying a schedule of wages paid to their employees, and if found less than the trade union rate of wages, the tender be not entertained. 3. That the Board do insert a clause in all contracts to the effect that no portion of the contract work be sublet to any workman or workmen. 4. That in such parts of the work appertaining to a contract as cannot be done entirely by the contractor in the ordinary course of his business, sub-contracting be only allowed by the direct sanction of the Board. 5. That the workmen employed directly by the Board are not paid the recognised minimum rate of wages for the London district. The memorialists, therefore, pray that the School Board for London will favourably consider their requests embodied in this memorial."—Mr. Berdon, Secretary of the Federation, addressed the Board in support of the memorial, and submitted that the present system by which sub-contracting was allowed was detrimental to the interests of the ratepayers and injurious to the workmen, because it led to the scamping of work and the payment of a lower rate of wage. They urged that sub-letting should not be permitted, and that if the contractor paid a lower rate of wage than the minimum rate the Board should have power to terminate the contract. The memorial was sent down to the Works Committee for consideration and report.

A PLEASANT SURPRISE FOR THE WORKMEN.—Messrs. J. Rotherham & Co., wholesale drapers and warehousemen of Shoreditch, are having some very large alterations and additions to their premises, amounting to about 25,000 sq. ft. The work has proceeded with remarkable rapidity, the contractors being Messrs. Patman & Fotheringham, with Mr. H. Ford as architect. All the chimney stacks were completed on Saturday last, and the union Jack hoisted, and it occurred to Messrs. Rotherham that they should do something for the workmen. Accordingly, they consulted their clerk of works, Mr. John Cropley, with a result that each of the deputy foremen, numbering ten, were presented with 20s., and every workman (numbering 110) with 2s. 6d., and the clerk of works and Mr. Peter, the builders' foreman, received a most handsome recognition of their services. When the men knocked off on Monday, they were called together on one of the floors, and the clerk of the works, in addressing the men, said that he had been twenty-six years in the building line, and had certainly never known a similar incident.

A VISIT TO THE LEYTON SEWAGE WORKS.—On the 11th inst., a large deputation of students, numbering about eighty, visited the above works, and was received by Mr. W. Dawson, A.M. Inst. C.E., Engineer and Surveyor to the Leyton Local Board, who conducted them through the works and explained in detail the process of treatment from the entrance of the crude sewage, its passage through the mixers, on to the precipitating tanks, and finally through the presses, to its ultimate form as sludge cake. The deputation expressed themselves very well satisfied with the efficient, and thanked the Engineer for the useful information given to them.

THE "QUADRANT" KITCHEN-RANGE.—We have received a prospectus of this new kitchen-range, which seems to possess some advantages, notably that of having ovens heated all round and not only on the top; if the heat can be regulated, the consumption of coal must necessarily be much less than when the oven is only heated from the top and one side. Another advantage of this range is that the fire can be raised or lowered without

22,738.—SEWER PIPES: *D. G. Andrew*.—The socket, double rebated, or has two parts of different internal diameter, the part of the smaller diameter forming a seat for the plain end of the pipe, while the part of larger diameter forms a groove or channel into which the cement or clay for making the joint sound and watertight is introduced.

SCARBOROUGH.—Accepted for the erection of new buildings, and alterations at the Scarborough Union Workhouse, for the Guardians of the Poor. Mr. John Petch, architect, Bar-street, Scarborough.

Dr. Lewis, 10, Perth & Fox, £1.8 0 0
 Turner & Wood, Thos. Myers, 15 8 0
 Stating—Joseph Hartgrave, 77 0 0
 Heating, 20, Sept. Bland, 94 8 6
 Planning—F. Percy, 110 6
 Painting—J. H. Eastwood, 9 13 0
 (All of Scarborough.) £97 19 0

SEVENOAKS.—Accepted on basis of schedule of prices for leveling, installing, sewerage, &c., Argyle and Beech roads, for the Local Board. Mr. James Mann, C.E., Surveyor, Local Board Offices, Argyle-road, Sevenoaks:—
 Sidney Hudson, Streatham.

STROUD.—For additions and alterations to the workhouse, for the Union Guardians. Mr. W. H. C. Fisher, architect, 6, Rowcroft, Stroud:—
 A. S. Cooke, £75 0 0
 N. Baxter, 35 0 0
 F. Duddridge, 38 10 0
 E. Beavis, 35 0 0
 H. Beavis, 350 0 0
 J. Poulton, 344 7 0
 C. Hook, £338 14 0
 J. Lewis & Sons, 325 0 0
 H. Alderwick, 320 0 0
 Wall & Hook, 397 0 0
 English & Sons, 305 10 0
 Stroud (accepted), 305 10 0

SURBITON.—For the construction of sewer, &c., at outfall, Kingston-on-Thames, for the Improvement Commission. Mr. Samuel Mather, C.E., Victoria-road, Surbiton:—
 S. Kavanagh, £210 0 0
 S. Atkins, Kingston-on-Thames (accepted), 186 7 6

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 Hunt & Sons, 1,170 0 0
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 wick, Norwich, 1,200 0 0
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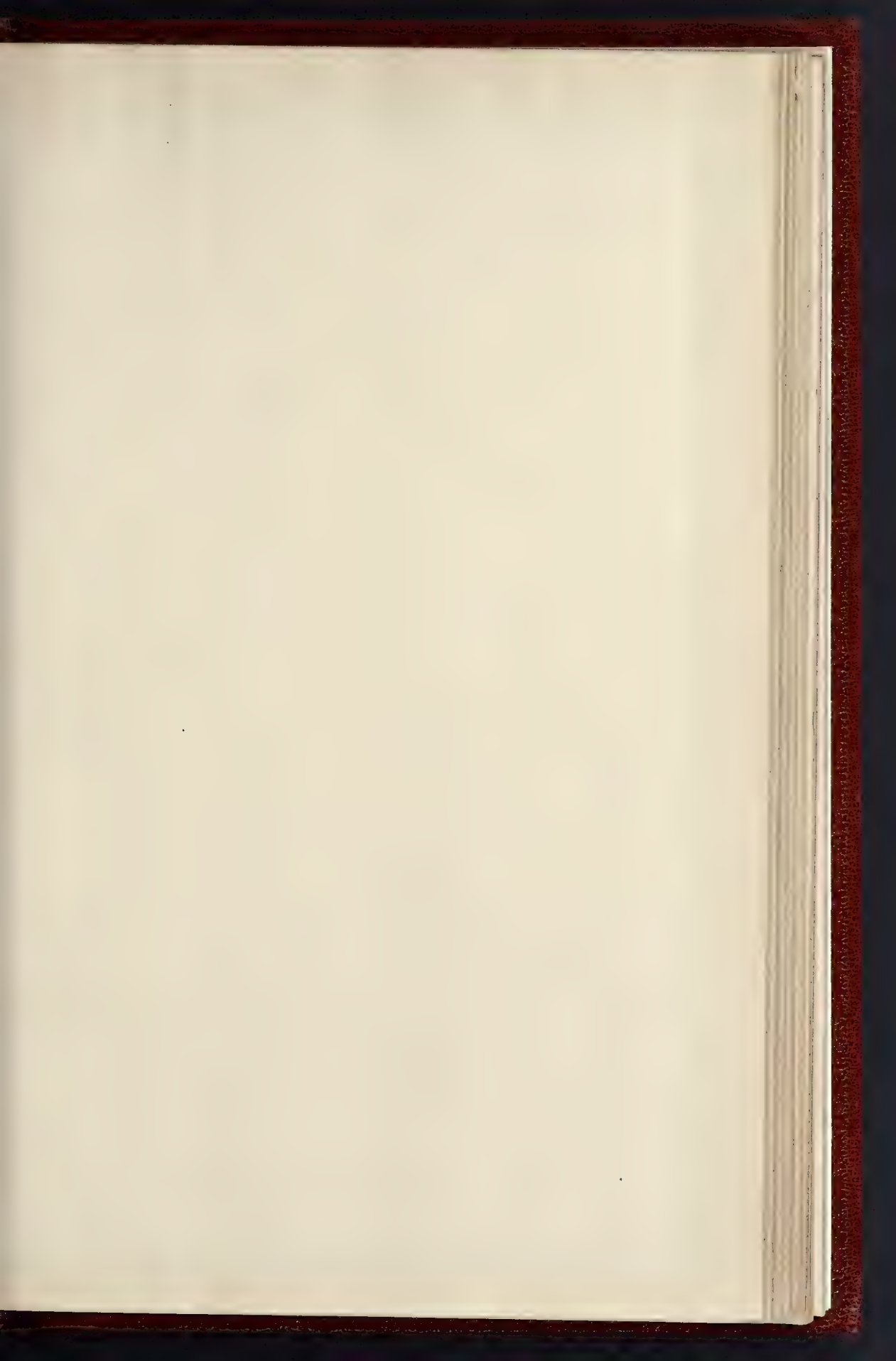
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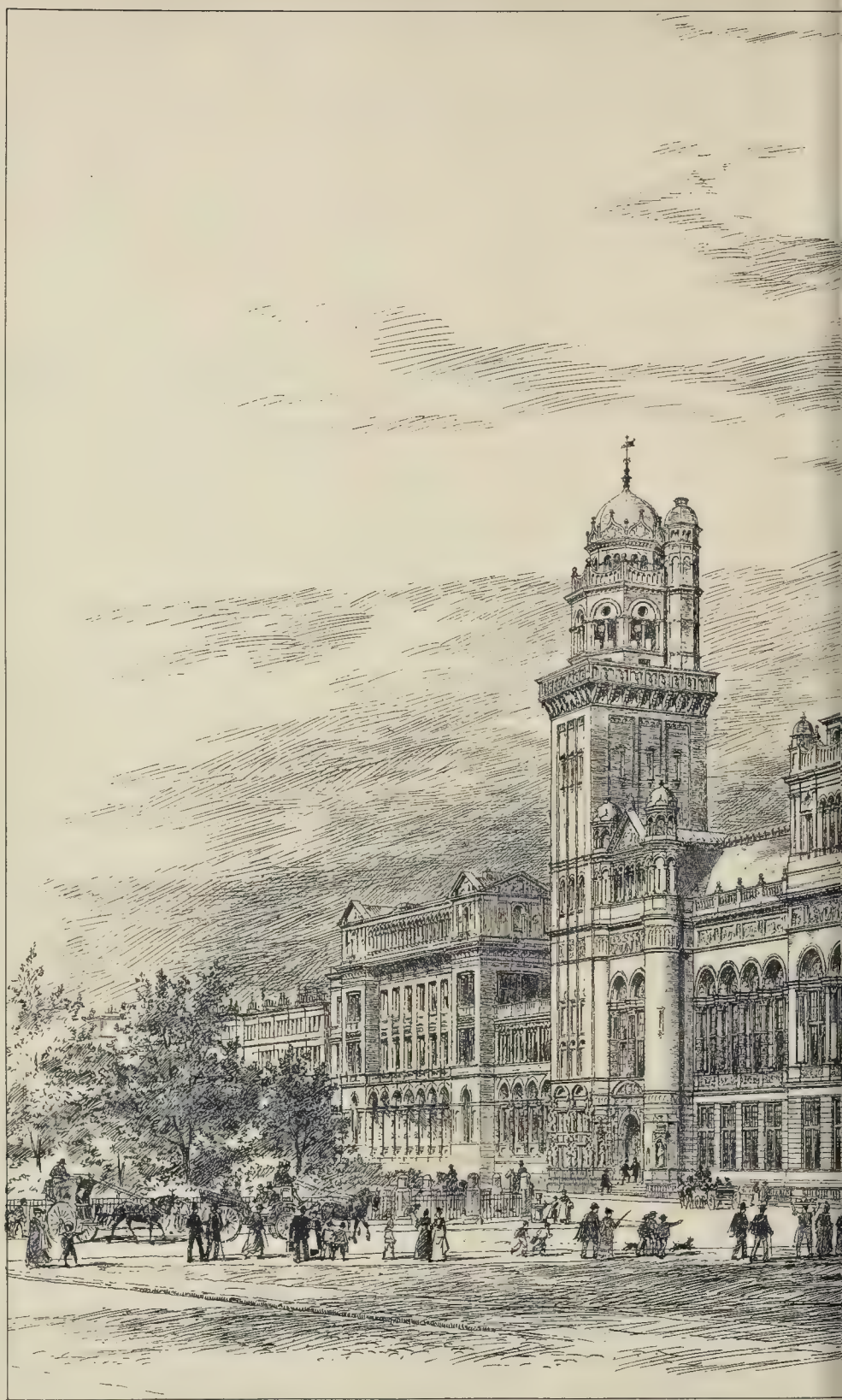
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Royal Academy Exhibition, 1893.



COMPETITION DESIGN FOR SOUTH KENSINGTON MUSEUM - By MR W EMERSON FRIBA

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The Builder.

VOL LXV. No. 2651.

NOVEMBER 25, 1895.

ILLUSTRATIONS.

Competition Design for South Kensington Museum.—By Mr. W. Emerson, F.R.I.B.A.	Extra Large Photo-Litho.
Battersea Town Hall: East Side.—Mr. E. W. Mountford, F.R.I.B.A., Architect	Double-Page Ink Photo.
Sculpture, Battersea Town Hall.—Mr. Paul R. Montford, Sculptor	Double-Page Ink Photo.
Church, House, and Schools, Bexhill-on-Sea.—Mr. P. H. Tree, F.R.I.B.A., Architect	Single-Page Photo-Litho.
Competition Design for County Council Offices, Stafford.—By Mr. W. A. Pite, F.R.I.B.A.	Single-Page Photo-Litho.

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Some French Decorative Work.



THE so-called exhibition of French Decorative Art at the Grafton Gallery, regarded as a whole, must be pronounced to be an egregious failure, and in fact a complete

falsifying of the expectations held out when it was announced. An exhibition which really constituted an adequate representation of French decorative art of the present day would be an event of the highest interest, and would merit the most careful consideration and criticism. But the exhibition at the Grafton Gallery is nothing of the kind. With the exception of the cases containing collective examples of the work turned out by some eminent porcelain and pottery manufacturers (in some of which there is a good deal more of trade than art), and that containing examples of J. P. Brateau's admirable silver and pewter work, the exhibition is a collection of odds-and-ends. There are half-a-dozen pieces of furniture, none of them very good; a couple of designs for wall-paper; a few characteristic designs for posters; some pieces of exceedingly bad stained glass, among which Champigneulle, who is really an artist in stained glass, is represented by possibly the worst thing he ever did (an imitation Japanese picture in stained glass); a few really good bits of metal work, and a heterogeneous collection of engravings and etchings, which are not decorative design at all, and have no place in an exhibition such as this professes to be. The ignorant manner in which this exhibition has been puffed by the daily press, as if it were one of extraordinary interest, is as amusing as the purring satisfaction of the purchasers of *objets de luxe*, who regard their predilection for expensive trifles as evidence of a taste for art.

Nevertheless, unsatisfactory and disappointing as it is, the exhibition contains a few things which are interesting and original as design, and a good deal of very beautiful material and workmanship, and in some points it certainly affords matter for instructive comparison with our own exhibition of "Arts and Crafts," which is open in another

hall, and to which the exhibition at the Grafton Gallery was obviously intended to be a contrast and a rival, and might have been made a very important one. At the "Arts and Crafts" we are everywhere met by the evidence of a recognised principle in design; there are things which ought not to be done in design, and they are not done. On the other hand we are conscious of a certain coarseness of material and want of finish in execution in much of the work exhibited; an ostentation of simplicity of design, which is sometimes carried too far. There is an art for the palace as well as for the house and the cottage, and this is barely recognised by the "Arts and Crafts" exhibitors. A great deal of the work at the Grafton Gallery, on the contrary, savours too much of the palace, of the *salon*, in that the elements of costliness and show are more predominant in it than that of conscientious design. This absence of principle in decorative design gives to a collection of French work—even one so inadequate as this—an appearance of greater variety as compared with such work as is exhibited at the "Arts and Crafts," concerning which a French visitor complained to us that it seemed "all of one school." Now in reality the "Arts and Crafts," though perhaps rather a clique exhibition, has no lack of variety in style and treatment; what strikes the French eye as monotony arises, we suspect, from that subordination to certain generally recognised principles as to what may and may not be done with a special process or material. The French decorative artist hardly seems to have any principles in this sense; his principles at all events do not hinder him from perpetrating a whole caseful of superbly executed porcelain dishes in the shape of fowls, ducks, &c., with their bodies hollow and open on the top; this sort of thing gives "variety," no doubt, but it is a kind of variety which would not be admitted into such an exhibition as the "Arts and Crafts," and would only attract the finger of scorn if it were.

This tendency to waste splendid execution on work which is thoroughly bad in idea is seen in its most marked form in the case of porcelain objects by Lachenal, which appears to form to the average visitor one of the attractions of the exhibition, and has received so much foolish praise in the daily papers. Granted that the colour and lustre of these articles are superb; that does not

alter the fact that these realistic birds, in various excited attitudes, made into dishes and tureens, &c., represent the very worst and most vulgar taste as far as design is concerned; they are things which we should imagine no artist would have on his table; at the Arts and Crafts Exhibition they would simply be jeered at. Yet all this praise is to be bestowed upon them because they are finely executed and are the work of a very celebrated Paris firm; and we are told in one of the notes which are inserted in the catalogue (to impress the mind of the ignorant sightseer) that "important works by M. Lachenal have been acquired for the museums of Paris, Sèvres, Limoges, St. Etienne, London, &c.": a sort of challenge to the spectator, who is supposed to be over-awed by this statement of the celebrity of M. Lachenal's work.* If the things bought for the various museums named are of this type, we can only say, so much the worse; they had much better have been forgotten. Of other porcelain exhibited that of Deck is nearly always in good taste, and always beautiful in execution; it does not, however, seem to display much fancy or variety, when taken as a whole; it represents ordinary ideas in faience carried out with very superior workmanship; always satisfactory, but rather superficial in interest. The works by Knœpflin belong to the same school, with a little more individuality of character; indeed in the large barbotine vase (347) which stands in the centre of his case, the outline of the vase, which is very beautiful in regard to its shape and the quasi-Oriental ornament over it, is to a great extent spoiled by the incomprehensible and ugly serpentine appendage which seems to twist round it. Dalpayrat, in his "Pièces in Grès Flammées," has produced some very interesting works, based a good deal on Japanese art, but remarkable for the rich quality of colour and surface which he has attained; form is little considered, it is true, or rather the form consists in the avoidance of definite form; but the colours are like those of fruit rather than pottery, and the effect of the collection is really remarkable.

* The same system has been adopted throughout the catalogue, of giving statements of the important institutions which have purchased this or that class of work; a kind of effort to cook up a fictitious interest about them which one is inclined to resent very much.

The few pieces of furniture exhibited are curiously significant. A carved bookcase in the large room is an exquisite specimen of highly-finished work, but what we should call weak in detail, and especially in the knots of buds made to stand out up the angles of the door-stiles, giving a rather gimcrack effect, and moreover representing a quantity of wood cut to waste to produce it, unless these excrescences are really fixed on, which would be still worse. A grand piano, by Mdlle. Desbordes, painted and varnished white and splashed all over the top with a riot of flowers in heated vinous colours, is the sort of thing that we might imagine in some of those boudoirs of the *demimonde* in French novels which are described as furnished "avec un luxe effréné"; it is a detestable thing from an artistic point of view. A cottage piano of the most ordinary type of case is shown, painted with flower-wreaths by the same exhibitor; pretty in a light way, though not what we should call decorative design; but the point about this is that we have at last recognised in England that if a piano is to be decoratively treated, the treatment of its lines of construction is the first thing, and the superficial decoration only secondary to that. The only bit of furniture we noticed in the gallery which is designed on this principle, and which would meet with approval at the Arts and Crafts, is the small Baby-linen Wardrobe, by Charpentier, in one of the rooms, which by the way shows a new and ingenious form of drawer-handle.

Among the furniture exhibits, however, there is one novel and interesting piece of decoration, the buffet in the large gallery, designed by Comte R. de Montesquiou, the front of which is decorated by a very charming marqueterie inlay of conventional flowers, &c., designed in a manner specially suited to the material. This part of the work has been executed by M. Galle de Nancy.

Among the things that one can study with real pleasure is the case of pewter work (with one or two pieces of silver intermixed) by J. P. Brateau. This stands close by the case of Lachenal's absurdities, and it is instructive to contrast the two; on the one hand costly material and workmanship bestowed on bad art; on the other hand refined and delicate design giving a value to work executed in cheap material, and providing us with really charming artistic utensils at a comparatively low cost. A few works of the same class by Charpentier, who has been before referred to, are even better; his design for two lock-plates (No. 40) with metal bas-reliefs representing respectively "Song" and "The Violin," are delightful, and these are things which quite appeal to the English spirit in ornamental design, and would have places of honour at the New Gallery. A cafetière by the same hand (31) is also admirable. The wrought-iron work by E. Robert exhibited in the octagon room is interesting, because, while right in treatment in the main, and such as our wrought-iron artists will approve, it displays a distinctly marked difference in manner. We observe however that M. Robert has at all events not escaped one of our weaknesses in wrought-iron work, that of mixing a little bit of realistic foliage with work conventional in all the other details, and thereby striking a false note and spoiling the whole. There are in the central room one or two knockers—one by an eminent sculptor, M. Injalbert—which are fine pieces of work in themselves, but not good as knockers, because their design has no sort of reference to their use as such. It seems to be considered sufficient to carry out a good piece of small design in iron or bronze—perhaps, like one of these, a delicately modelled nude figure seated on some part of the design—then to hang the whole thing up by a hinge on to a door and call it a knocker. You can knock with it, no doubt, but that is not enough; the thing should have a shape which is convenient for that use, and suggestive of it, otherwise it is not in the true sense a design

for a knocker; and we do not believe English artists of the present day would be likely to make this mistake.

We should not forget to mention also the small metal relief works by E. S. Vernier, hung on the wall of the large room. The silver-gilt medallion of a woman's head, "Pervenche," and the small bronze plaque of the French delegates at the Working Men's Congress at Berlin, are admirable. Near these is also a very well-designed circular bronze plaque by M. Joiny, a decorative figure of the French Republic.

In the matter of decorative designs for covering walls—wall-papers or wall-diapers—the French, if we are to judge by this exhibition, seem to be lamentably behind us; indeed, to be literally nowhere. It is true that there are only two wall-paper designs exhibited—two designs stamped in a good many variations of colour—but as these are by M. Couty, and we are told in one of those admonitory notes in the catalogue that cartoons by M. Couty (of this kind of work we presume) have been purchased by the Sèvres manufactory, the Manufacture Nationale of Beauvais, &c., we presume that these represent what is recognised in France as good work. We doubt if they would have obtained a prize in the National Art competitions for South Kensington students! They certainly would not be admitted at the Arts and Crafts Exhibition. They are mechanical pattern designing, without either freedom of line or beauty of colour, and if the French have not got further than this in modern wall-papers, they had certainly better go through a course of Mr. Morris's designs. Then we have M. Grasset's cartoons for wall-mosaic decoration, founded on lilies, for the Church of Briare; stiff wiry neo-Gothic design, with none of the genuine Gothic feeling left in it. The only examples of wall-covering here of which we can speak with full and frank admiration, are the specimens (far too few) of designs for wall posters by E. Grasset. These are admirable, and are a lesson to England, with her profusion of ugly and vulgar poster pictures. There is no attempt to make too much of them; the design is neat, broad, and simple, and due space and prominence are given for the announcement; but the design, always a figure of some kind, admirably drawn, at once calls attention to and embellishes it, and transforms the mere bald announcement of an entertainment into a bit of elegant and suggestive fancy, as well as a pleasing decorative object. We only wish all the art at the Grafton Gallery show were as good of its kind as this.

It is to be hoped that on some future occasion an effort will be made to get up at the Grafton Gallery an exhibition of French decorative art which will be more really representative. Such an exhibition ought to be of the greatest interest, but it should be arranged on a much more comprehensive basis and in a more systematic manner than the present one.

A BLUE-BOOK ON WOMEN'S WORK.

AN interesting Blue-book, containing "Reports by Lady-Assistant Commissioners on the conditions of work in various industries in England, Wales, Scotland, and Ireland," was issued a few weeks since. The reports have been prepared for the purposes of the Royal Commission on Labour, and deal with almost every industry in which women are employed. Miss Collet devoted herself mainly to a consideration of tailoring, dressmaking, millinery, hat-making, shirt-making, and of the work of shop assistants. Miss Abraham reports on the textile, hosiery, and other industries of the Northern and Midland counties, and also on the conditions of work in three provinces of Ireland. Miss Irwin treats of Scotland, and Miss Orme, the Senior Lady-Assistant Commissioner, describes the lot of barmaids, and also gives the results of her investigations concerning female labour in Wales and Munster. Much of the information recorded

by the four ladies does not, of course, fall specially within our province; but their observations on the sanitary conditions of many of the workshops and factories appeal forcibly to us and to our readers. Speaking of Yorkshire mills, Miss Abraham writes:—

"Imperfect sanitary accommodation, about which complaints are frequent, I find to be common to all mills, and to exist in the majority of those I have visited, or about which I have received evidence. The accommodation provided is seldom sufficient for the number of women employed; the closets are in a dirty and offensive condition, owing to an imperfect system of drainage, and frequently the only ventilation is from the workroom. In some places there is not more than a foot and a half between the worker and the door of the lavatory. What is known as the 'tub system' is in most general use, both inside and outside the mills. When situated in the mill-yard, and having free ventilation, it is often unobjectionable; but in those mills where the accommodation is inside, the women raise great objections to it, and complain that owing to neglect the closets are sometimes unfit to use, and that the effluvia in the rooms is actually injurious to health. In a small number of cases there is a regular supply of water, and when this is so the accommodation is otherwise good and clean."

The injurious effect which such insanitary conditions must have on the health of the workers is well understood by all who know anything about the principles of hygiene, but what is not so well known is the still deeper injury which they inflict on the moral nature of the girls and children who are compelled to labour in the midst of them. Not only are the finer sensibilities of girls and children blunted—and this is bad enough—but actual immorality is induced by the noxious conditions. At one weaving-shed the closets, which open directly from the shed, are *without doors*, even though men and women are working together in the room; the effect of this on a refined and susceptible girl-nature must be painful and degrading. If masters would only think of their own wives and sisters and daughters, they would surely not tolerate such arrangements for another day. But it seems also clear that actual immorality is induced by the sanitary accommodation being either insufficient or badly contrived. Miss Abraham's own words concerning the Yorkshire mills are as follows:—

"A general cause of immorality in girls and children is insufficient sanitary accommodation, the same closets being common in some mills to men, women, and children. A great deal of importance is attached to the evil effects of this system upon the morals of the workpeople by persons in the district, and from incidents which came under my own observation I can fully endorse their opinion."

And speaking of the Lancashire mills she says:—

"Though the conditions of mill life in Lancashire are closely similar to those in Yorkshire, I found a larger number of cases of actual immorality and of immoral tendencies. I see no explanation for this, except in the fact that the sanitary accommodation is much more frequently common to men and women in Lancashire than it is in Yorkshire. Two cases of immorality have been directly traced to this, and it is mentioned as the cause of much loose language and immoral behaviour."

The vicious effect which an insufficient number of closets may have on children has not been overlooked.

"The immorality of children is attributed, and probably correctly so, to the fact that the inadequate sanitary accommodation I have mentioned as being so injurious is most general in spinning-rooms, and this is just the part of the mill where children are largely employed."

In reference to this part of the subject, Miss Abraham draws attention to the regulations of the Education Department with respect to the number and nature of the closets required in schools, and considers that "if the same standard of sanitation and decency were enforced in mills, a very valuable improvement would result in the moral condition of the persons employed." We earnestly hope that something will soon be done in the direction she indicates.

But it is when we come to consider the kind of conveniences which are provided for the operatives that we are most surprised, and are tempted to ask the question, "Are there no building bye-laws or nuisance inspectors in the North of England?" It is a

disgrace to the urban authorities in Lancashire that the following words can be written about buildings within their jurisdiction. Surely Miss Abraham's report will rouse them from their lethargy.

"I found the sanitary accommodation in Lancashire mills more universally bad than in mills of a similar class in Yorkshire, and I attribute this to the greater heat used in the manufacture of cotton, which tends to increase the effluvia. In the majority of mills the closets are without ventilation, and open directly out of the rooms. The tub or pail system is very general, and, in addition to its other disadvantages, is the method of removal. In Yorkshire the common practice is to take away the tubs from the outside, but in Lancashire they are carried through the rooms.* This is done during working hours about twice a week, and on each occasion the air of the room is vitiated."

The foregoing system, though bad enough, is infinitely preferable to the one next described, which may perhaps be best characterised as a water-closet without water. It recalls the filthy arrangements of many continental houses and hotels.

"Another system which I have found objectionable is that known as the bog system. Pipes connected with the lavatories (? closets) pass through every story of the mill, and at the bottom end in a cesspool, described as a 'bog.' This cesspool remains untouched always for a considerable time, and sometimes for as long as twelve months. The effluvia is generally extremely bad, and, as a rule, worse in the lowest room. No water is used, and the pipes become stopped, causing the closets to get into a filthy condition. I was surprised to find this system in a modern and otherwise well-constructed mill of considerable size. Although the cardroom out of which the closets open is lofty and well ventilated, the effluvia was, at the time of my visit, noticeable at a distance of about ten yards. This was so, notwithstanding good ventilation in the closets, the floors of which had been washed with a disinfectant in anticipation of my visit."

It would be interesting to know whether an architect was employed to design the "modern and otherwise well-constructed mill of considerable size," in which this deadly "sanitary" contrivance is in operation. We fear that such would be the case, for mills are not run up in scores by speculating builders. But for the credit of the profession it is to be hoped that we shall hear no more of the "bog system" of sanitation. We are well aware that architects are often blamed for the faults of their employers; it may be that in this "modern" mill, the employer refused to go to the expense of proper water-closets and well-laid drains, even though his architect urged him to do so. If the architect's persistent efforts to render a building healthy are met by the direct refusal of the owner, the architect's position is decidedly unfortunate. Professor Herkomer once said in an address to architectural students and others, that it was the duty of the younger architects to evolve the power within them to make their clients obey them; it was no use giving way to their clients; they must make their clients their pupils for the time, and considered as their pupils, they would raise them to a point which would surprise the clients themselves. Perhaps it might be possible for an architect to cram his ideas of art down the throat of his patron; but in the case of a millowner, intent on saving money, the only course for the architect to adopt, unless he yielded to his employer, would be to throw up his commission or rouse the local authorities to action. The chief point for architects to consider is this. Do they sufficiently insist, in such cases, on having the sanitary arrangements of buildings made as perfect as modern science will admit? Or are there really people practising as architects who are content to go on using any insanitary arrangement to which they or their employers have been accustomed?

The lady commissioners also draw attention to the hot foul air in many of the workshops; but into this part of the report we do not propose to enter. The lessons to be learnt from the present unsatisfactory condition of mills are tersely put by Miss Abraham.

"In conclusion, I am of opinion that the conditions of mill life in Yorkshire for women and children could be much improved by a more thorough system of inspection in factories. It is not possible for the present staff of inspectors to devote time to a detailed inquiry; nor is it possible that they should, without such inquiry, become acquainted with the conditions of women's labour. The difference of wages for men and women where both are engaged in the same employment appears to be a matter for trade organisation, but the due ventilation of the work-rooms, the safety of machinery, and the necessary sanitary arrangements, could be enforced by law—i.e., if it were possible for the inspection to be efficiently carried out."

We heartily endorse Miss Abraham's opinions, and trust that sufficient inspectors will be appointed to ensure that the simple rules of common decency and of hygiene shall not be set at naught as they appear to be so frequently at present. The four ladies have amply justified their appointment by the value of the reports which they have submitted for the consideration of the Commission, and we shall be glad to find the new Labour Department of the Board of Trade issuing regulations about the number and nature of conveniences, so as to obviate the present disgraceful conditions, which are a standing menace not to health only but also to morality.

NOTES.

THE long-delayed settlement of the great coal dispute has been hailed with general satisfaction, and the story of this struggle will probably occupy a foremost place in "labour" history. It is clear that the independent character of the president at the late conference—apart from any question of personality or position—was an important factor in averting a failure similar to that of a few days previously; both parties to a dispute of this nature being under a certain disadvantage while addressing themselves to a chairman largely interested in it. In the resumption of work at the old rates for a limited period (until February 1), both sides make a concession, and in agreeing to the establishment of a Conciliation Board they bring some good out of evil by making provision against the recurrence of such a bitter strife. Disputes will doubtless be no less frequent in the future; but so long as the decisions of the new Board are respected, they will be settled in a less suicidal manner. It has been remarked that the strike and the lock-out always remain as possibilities behind Conciliation Boards; and that, so far, no power has been found strong enough to give effect to their decisions. The operations of the Board about to be formed will be keenly followed by the public, who have been forcibly reminded that their interests are closely bound up with the coal trade of this country, and, in the event of any such failure as that alluded to, the question of the adjustment of labour disputes will be recognised as one imperatively calling for the attention of the Legislature. Indeed, there seems to be no need to postpone the consideration of this important matter, for, without detracting from the credit due to Lord Rosebery and Mr. Mundella, it is very largely due to the wearying effects of the deadly struggle upon the combatants that peace has been declared. The intervention of the Government, in itself a valuable precedent, partook rather too much of the nature of a forlorn hope, and, although it was happily successful, we might well turn our attention to the better securing of the stable door before February 1.

THE London County Council on Tuesday adopted an absurd recommendation of their Fair Wages Committee, to the effect that where there is no trades union to fix the minimum wages in any trade the Council itself shall fix the minimum rate, minimum hours to be worked, and the conditions to be observed. Practically, if a proper decision as to what ought to be a minimum wage and minimum hours is to be arrived at, a careful inquiry into the condition of the particular

trade, of the locality, and of the position of the workers ought to be undertaken before a contract is made. The Council have to buy brooms for sweeping their premises. If there is no trades union among the makers of these articles, and they are obtained from some particular locality, the Council will have to inquire into all the circumstances of the trade before they make a contract. It is obvious, too, to follow out our illustration, that if the Council, before buying brooms, state that the makers are to be paid a certain sum per hour, and are to work only for a certain number of hours per day, it will have no permanent effect, because other persons or corporations who wish to buy brooms will not pay more than they need do. The result, therefore, of this resolution will be to give a bonus or present to certain workpeople out of the pockets of the London ratepayers and working men, since the money to pay the above minimum wage must come out of the metropolitan rates. The recommendation was opposed both by Sir John Lubbock and Lord Farrer, but the bulk of the Council are too little men of business to submit to the guidance of men of experience.

AN important case has been just decided before the stipendiary magistrate of Sheffield, in which certain owners of street property made a formal protest against the requirements of the Corporation Surveyor in regard to street improvements and drainage, as being unreasonable and entailing excessive and unnecessary cost. It is impossible for us to go into the details of the case, which was argued at great length before the magistrate, and it is hardly possible to form any opinion in regard to the reasonableness of the complaint made by the owners of the property without an inspection of the site. There can be no doubt that the demands made by the Corporation Surveyor, Mr. Wike, were all in pursuance of maintaining the most efficient state of street surface and drainage; the most essential point in the complaint was that the Surveyor was demanding a style of paving and finish for the roadway which, however desirable for an important street with large traffic, was unnecessary in a street of the class under discussion. This if it were so, it was at all events an error in the best direction. Part of the case also turned on the question whether some of the improvements required ought not to have been done at the cost of the Corporation; which is a matter, of course, of the reading of local by-laws and regulations. The magistrate, in regard to the question of paving, decided in favour of the objectors, and ruled that the demand for granite paving was "unreasonable," and that limestone tar macadam was sufficient under the circumstances. The magistrate seems to have gone into the case very fully and very fairly from his point of view; but it is a curious and rather undesirable innovation that questions of this kind, which concern the constructional and sanitary maintenance of a city, should be decided by a magistrate who can have no special knowledge of such subjects, instead of being decided by the Surveyors' department of the Corporation, which is the official authority on such subjects.

WHITBY is a most picturesque town, dear to artists, and a resort of holiday-makers, but the enthusiasm of its admirers would perhaps be a little checked by the perusal of some portions of Dr. Maclean Wilson's report to the Local Government Board on the sanitary condition of Whitby and the district. Whitby, indeed, appears to be a decaying town, unless an energetic local government can put new life into it. One reason for the decay of the trade is that the larger ships of the present day cannot enter the harbour. Many of the houses, we are told, are ruinous, and many others, from want of sunlight and of ventilation and from dampness, are quite unfit for habitation. From the nature of the site on which they are built, houses are often

* The italics are our own.

necessarily half buried in the ground on one side, the soil at the back being level sometimes with the upper floors. The worst dwellings are uninhabited, not by any action of the Sanitary Authority, for no action has been taken by them under the Housing of the Working Classes Act, but by a process of natural selection; many of the labouring class have left the place, so that those who remain can choose the better sort of dwellings, leaving the worst to go to ruin. This does not so much affect visitors, as they go mostly to the West Cliff, where the houses are large and airy, arranged in terraces and crescents with wide thoroughfares. Most of these last are let in lodgings in the season, and very few visitors live in the old part of the town. But the comprehensive sewerage scheme for the whole town, begun in 1885, is not yet completed, and that portion of it which is complete discharges into the harbour just under the part of the quay where the fish-market is held, and where passengers are landed from excursion steamers. The intention was that ultimately the main sewer should be taken across the harbour to discharge into the sea beyond the East pier. We should advise visitors to refuse to go to Whitby again until that is done. The visitors, however, are not the only people to be considered (though it does seem absurd that visitors in search of health should be landed at the end of a drain); the poorer portions of Whitby which are continuously inhabited are evidently in the most insanitary state. The town is full of roughly-paved courts or "yards" drained by ill-laid open channels in the centre:—

"The people who live in the yards say that when anything solid lodges in the channels the dirty water runs over the surface of the yards, creating a nuisance in summer and making the steep pavements dangerous in winter. Near many of these channels were seen holes in the pavement filled with strong-smelling sewage. The houses in the part of the town behind the railway station all have sinks in their back kitchens, few of them have water-closets. A great many of the sink pipes run directly into the drains, some of them quite untrapped. The fall-pipes from the roofs also seem to be connected directly with the drains without the intervention of traps. In the West Cliff property, where all the houses have water-closets, the same want of disconnection of the house drains and also want of ventilation of the soil-pipes were very common, but at the present time many householders are having 'interception chambers' laid in the course of the house drains and full-bore ventilating-shafts carried up from the soil-pipes.

In the old town almost every house has a pail closet, or a midden privy, with a small receptacle formed in the space under the seat. The floors of closets and privies are often of wood or of uneven brick or stone pavement, seldom raised above the level of the ground, and often soaked with liquid filth; but by degrees the worst of them are being replaced by structures erected in accordance with the bye-laws, which are based on the model of the Local Government Board.

It is satisfactory, also, to find that the emptying of these closets is undertaken by the Authorities, and, apparently, regularly carried out. But it is evident that a great deal remains to be done before Whitby can be considered a "health resort," and we fear there cannot be much money to do it with.

THE Town Council of Wiesbaden has been engaged in a discussion on stage machinery. The town is at present building a new theatre, which is to be taken over by the Court Theatre administration, and intended only giving the building a stage worked by manual labour, at a cost of some 2,50*l*. The Court administration, whose annual bill is to include over a hundred different operas and dramas, could not see their way to carrying out their programme and the amount of scene-shifting it would incur without having a modern stage with hydraulic power, the cost of which would be 8,500*l*, and further considered such power a necessity for the lifts in the scene-store. Herr Von Huelsen, representing the Court authorities, in the course of his arguments brought forward a most effective and novel point by saying that water-power would, in this case, be a necessity for the regulation of the orchestra floor quite independently of

its adoption on the stage. His varied programme practically prevented his keeping the orchestra on the same level for two consecutive nights. Wagner's music, and other music of that school, required the sunk Bayreuth orchestra; Mozart's music, or a light operetta, a higher orchestra; whilst for dramas, a few extra rows of stalls might be convenient, and probably no orchestra would be wanted. We do not know of any such orchestra where the floor practically resembles a lift, either moved by manual or other power, and must congratulate Wiesbaden on eventually deciding to have this innovation, as well as a thoroughly up-to-date stage. With the regulation of the orchestra floor in the manner proposed by Herr Von Huelsen, the acoustics of an auditorium can probably be regulated, as far as the music is concerned, even in accordance with the number of people actually in the theatre. It will, however, be well to avoid using much iron in or below the movable floor, to prevent the tone being spoilt.

WE observe that this month's number of the *Strand Magazine*, which was issued simultaneously with last week's great City fire, contains an article on great London fires, in which Mr. Sydney Greenwood popularly describes most of the great conflagrations, commencing with the catastrophes of 1666 and 1748. Some interesting photographs of the more important fires of the last decade are shown, which well illustrate the large areas often affected, and testify to our imperfect system of protection. It might be in the power of our popular contemporary to do much good by making a descriptive article of the kind instructive by publishing warnings or instructions as to the prevention of conflagration. To practically try to excuse the long list of serious fires by letting Mr. Greenwood say, in reference to the St. Mary Axe fire, that "it is a matter of impossibility to put out so much combustible material immediately," simply does harm. The final sentences of the article actually leave the impression that a fire *must* take its course, and that we should think ourselves fortunate that its area is at last generally confined to some extent by our firemen putting water on it from adjoining housetops. As far as London is concerned this reading would unfortunately be somewhat near the truth; but it does not necessarily follow that this view should be so put before the public as to make our London fires seem inevitable, and insurance policies our only personal safeguard against losses.

THE ruins of Tiahuanaco, in Bolivia, form the subject of an interesting volume by Messrs. Stübel & Uhle* which has been recently published at Breslau. This work supplies a long-felt want, seeing that the only standard book on the subject has hitherto been that of the Spanish author, Pedro de Leon, who visited the ruins in the year 1560. These ruins are the oldest in South America, and are supposed to date from the time of the Aimara, that is to say, before the conquest of the country by the Incas. They are situated about fifteen miles to the south of Lake Titicaca, the principal group extending over a space of ten hectares (about twenty-five acres), and the Southern group (Pumapunga) over one hectare. For the most part, the ruins consist of unfinished walls and gateways, together with a vast number of stones in various states of preparation; from which it is concluded that the works were broken off suddenly before completion. The principal group comprises the citadel, the temple, with its large gateway, and the so-called Inca's bath. The temple gateway is ornamented with figures of various animals in relief, whilst over the entrance is a large human head. The material used is mainly lava, supplied by the volcano Cerro Capira; it is difficult to reconcile the highly-finished state of these hard stone blocks with the fact that no metal tools could have been

employed. It is probable that the blocks were first treated by fire, and then wrought upon by yet harder stones. From an investigation of these ruins, Herr Uhle contends that the supposition that civilisation in America spread from South to North is quite as tenable as the hitherto generally received theory, that the builders of the vast monuments of Central America were the pioneers of civilisation in the Southern Continent.

SOME interesting details as to the results of the excavations at Sendshirli, in Syria, are to be found in the recently-published report of the Berlin "Orient-Comité." The scene of the excavations is a Kurdish village situated on the upper waters of the Kara-Su, which flows into the Mediterranean near Antioch. The most important work of art discovered was the statue of Assarhaddon, erected B.C. 669 on his return from a successful expedition against the Egyptians; it is 10 ft. high by 4 ft. in breadth, being the largest of an Assyrian monarch hitherto found. On the pedestal are inscriptions giving an account of the campaigns against Taharka and Baal, King of Tyre. Antiquarians will, however, be chiefly interested in two other inscriptions, discovered at Gerdshiri, about five miles north-east of Sendshirli, which are apparently the oldest we yet possess in the Aramaic tongue, and throw considerable light on the history of the country at the time of the invasion of Tiglas in B.C. 738.

A COMMISSION, to be issued by the Bishop of London, is about to consider the expediency of uniting the benefices of St. Botolph, Bishopsgate Without, and St. Ethelburga, Bishopsgate-street. It seems then that the church of the latter, a relic from the Great Fire, is marked for demolition. This little church, dedicated to the wife of Edwin, King of Northumbria, is described by George Godwin, in his "Churches of London," as consisting

Of a nave and south aisle, separated by plain clustered columns and pointed arches which support a clearstory, wherein are small windows. The ceiling, which is nearly flat (sloping a little towards the sides), and is divided into compartments by plain tie-beams supported on corbels, has been recently constructed under the able direction of Mr. William Grellier, architect. There are long pointed-headed windows without mullions in the south wall of the aisle, and corresponding openings, now bricked up, in the north wall of the nave, leading to the opinion that there never was a corresponding aisle on that side. The general character of the architecture renders it probable that this building was constructed in the fifteenth century.

At the west end of the church is a small tower which was formerly open to the main building. The large pointed arch springing from clustered columns, and spanning the nave, is visible in the upper portion of the tower. This arch is now open.

West and Tom's view of the exterior shows the west wall (of rubble-work) as having large openings, or embrasures, and terminating in a pedimental form. The street front has for a long time been encumbered with houses, two of which, being of wood, were copied by Mr. G. H. Birch for his "Old London," in the Health Exhibition, 1884. In 1701 the parishioners added a vestry at the east end; in 1629 a churchwarden, Owen Saint-Pierre, gave a quaintly-carved south gallery (removed about thirty-five years ago), long known as the "Maid's Gallery," inscribed, "Only for the daughters and maid-servants of this parish to sit in." The interior was repaired in 1701, and was restored by Withers in 1861-2. The organ was built by the firm of which Mr. Thomas Hill, who died in October last, was senior partner. On June 29, 1889, we published a two-page illustration of the chancel, with plan and description of Mr. H. D. Wilkinson's proposed restoration and additions, from a drawing hung in the Royal Academy Exhibition. The Dr. Milburne, whom Hatton in his "New View" names as rector, was Dryden's opponent in the matter of translating Virgil. Queen Elizabeth bestowed the advowson, which had belonged to the neighbouring convent of St. Helen's, upon

* "Die Ruinen von Tiahuanaco," von A. Stübel und M. Uhle. Breslau: C. F. Wiskott.

the Bishops of London. In the south wall are a piscina, and the doorway (now blocked) of communication, we are told, with the convent.

THE "Exposition Universelle, Internationale et Coloniale" to be held at Lyons next year, seems likely to be an exhibition of greater scale and importance than is usual in a provincial town. We are informed that the applications for space have been very numerous, and the promoters assert that it will be the most important thing of the kind that has been held in any continental city except Paris. The agent for Great Britain and Ireland is Mr. Brandreth, of the Anglo-Continental Contract Association, 52, Queen Victoria-street.

A CORRESPONDENT writes:—"The Dean and Chapter of Norwich are asking for 12,000*l.*, which they want to spend on "improvements and repairs" in their church before the year 1896, which will be its eighth hundredth anniversary. A great deal has been done at Norwich Cathedral during the last twenty-five years, and a large part of it has been pure mischief. Before the public find more money for the work it will be well to have some guarantee that it will be properly spent. At present no definite proposal has been published, and although references are made to reports by the late Sir Gilbert Scott and Mr. J. L. Pearson, it is not even stated that an architect will be employed. The church has already suffered so much from the tinkering of meddlesome amateurs that some assurance that it will now be properly treated is called for to restore confidence."

THE new number of the *Transactions* of the Edinburgh Architectural Association contains two or three papers of special interest, including one by Dr. Rowand Anderson on Dunblane Cathedral, the restoration and re-fitting of which for public worship he has just brought to a successful completion. In a discussion reported on another page of the volume Dr. Anderson defended his action in advocating the restoration of the building for its originally intended use, which was so foolishly and acrimoniously criticised by the Society for the Protection of Ancient Buildings; as if it were a kind of virtue to leave an old church to go to ruin, rather than put it in repair for the use of a modern congregation. A long and interesting paper by Professor Baldwin Brown, on "Bronze doors and their artistic treatment," with some illustrations, is another attraction of the volume, as well as a paper on Corstorphine Church, by Mr. Hippolyte J. Blanc.

A PARISH CHURCH DURING SERVICE TIME IN THE FIFTEENTH CENTURY.*

IT is curiously pleasant in an ancient parish church to attempt to picture to oneself the scenes which have taken place within its walls through the different centuries during which congregations have assembled there for the various services, and to try to picture the costumes of the men, women, and children, and their various manners, gestures, and interests.

We may take it that in many cases the actual walls of the fabric have remained practically the same through all the last eight centuries, the windows alone changing from one style to another, so that many a church will have looked on very many generations of worshippers.

It would be far too lengthy a matter to go into all these changes, but it may be of considerable interest to take a certain period and try to picture the appearance which any old parish church would present during service-time in, say, the middle of the fifteenth century. Let us try to do so. Let us imagine that we turn into the churchyard on a Sunday morning to take our place in the parish church, the date being about 1450. What do we see when in the churchyard?

* Two papers have been written on this subject, Mr. Micklethwaite's "Parish Churches in 1450" (*Arch. Jour.*, v. xxxv.) and Mr. Walcott's "Parish Churches before the Reformation" (*Leicestershire Arch.*, and *Arch. Soc. Rep.*, 1879). Neither has been made use of here, except when mention of them is made, but both are very valuable.

We see in place of the great tombs and headstones we know so well small crosses of wood or stone at the heads of the graves, in one case, or perhaps two, we notice an altar tomb.

The church externally appears (apart from a close inspection) to be just as we have always seen it.

The bells are ringing (the average number will be three).^{*} We now pass through the open door, and see the pillars, arches, roofs, pews, windows, high altar, piscine, squints, ambries, and stoup all looking very much as we have always seen them, excepting that the stoup is unbroken and full, or nearly so, of water. Very little difference we see here, but a very considerable series of additions we notice upon a closer inspection.

We see several altars, brilliant frescoes, lights burning on the rood-screen, on graves, and before carved figures and altars.[†] Above the high altar is, perhaps, the most striking feature, one to which our eyes are wholly unaccustomed. It is the suspended pyx or little metal box for the reserved Sacrament; it is veiled in a silk covering, and is suspended immediately above the altar.[‡]

We see the rood-screen between the chancel and body of the church surmounted by a gallery, with, perhaps, above that, a beam supporting an immense crucifix, with on either side the figures of Mary and John; or the beam supporting the figures may rest directly on the screen, with no gallery at all intervening.

Now we see the people coming in, and notice that some have particular seats to which they proceed unhesitatingly, apparently knowing them to be their own by some kind of right, in some cases by right of payment.[§] Almost every one in the parish is now present, for the service is about to begin. We see them kneeling, the garments of the fine lady appearing very gorgeous, as is the case with some of the great men and fops.

The apparel, however, of most of the people does not strike one as being out of the way, excepting that the colours are gay. The men we see in hose of white, red, blue, &c., tightly drawn over the legs, some with boots, some having shoes. A big overall covers the upper part of the person, which is in some cases gathered in at the waist, but not always. Some have their sleeves fitting very loosely, whilst others have them closely fitting to the arms, the whole being one garment, reaching to the thighs, and of red, blue, grey, or any colour. The dress of the women might in many cases be worn to-day without comment, but the hats and head-dresses of either sex are often striking and very various. Monks, friars, and nuns we see in the distinctive robes of their orders.^{||} The priests and clerks we recognise by the tonsure, but their dress is the same as that of a layman.[¶] Women we see wearing their head-dress, but not so the men.^{**}

Whether the men and women sat together or apart we know not; but in Overall's Accounts of St. Michael's Cornhill, allusion is made in 1459 to the men's pew and the women's pew.

For the appearance of the choir we must go to Mr. Micklethwaite.

"The poorer churches had plain benches, instead of the expensive stalls. In front of the stalls were desks, and sometimes in front of them were benches for the singing boys. I know of no example of desks being provided for singing boys. In the middle of the chancel stood a lectern, generally with a double desk made to turn, on which lay the Antiphoner and Grayle." Mr. Micklethwaite thinks the eagle desk was used properly to sing the gospel from.

The service has now commenced some time, and looking to the altar we see the priest standing before it, clad in a white alb and beautiful chasuble; to his right, at the south end of the altar, burns a single candle.^{††} In the centre of the altar is the chalice, covered with a veil.

We notice a priest in the choir who does not

* North's "English Bells and Bell Lore," p. 22.
† *Antiquary*, Jan., 1891, and English Guilds, E. English Text Society, pp. 74, 79, 85.

‡ Item that myn executors cause to be made a new box of silver gilted to hing the bisseil Sacrament in above the high altar, "Testamenta Eboracensia," At Hesselst in Suffolk, the pyx veil remains," vol. iii., p. 280.

§ "My body to be buried where I sit at mass." T.E., p. 207. The common pews are mentioned in the "Ludlow Churchwardens' Accounts," Camden Society, p. 12.

¶ Richard Watier pays zodi. for a pew." L.C.A., p. 16.

|| Mainly from the coloured plates of Furnivall's *Six Text Chaucer*.

¶ See Cutt's "Scenes and Characters."

** See Sepulchral Memorials generally.

†† Both Mr. Micklethwaite and Mr. Walcott give ample reasons for the frequent appearance of two candles on the altar. For one, however, we have contemporary pictures as well as documentary evidence. See Myrc's "Instructions" (Early English Text Society) and Mediaeval illuminations.

appear to take a very prominent part in the service. He is a chantry priest, whose business it is to perform the devotions founded by some departed parishioner, by whose will the chantry priest is to be present at the parish service.^{*}

All is now over, and we move with others to the door, but, though now nearly all are gone, we see the priest coming down the church in his alb, followed by the clerk, bearing a holy water vessel and sprinkler, and clad in a very full surplice, with wide sleeves. Down the aisle they go till they come to an old grave, when the priest sprinkles the grave with holy water, and says the Psalm, "De profundis," with its collects.[†]

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE second general meeting of this Institute for the present session was held on Monday evening last, at No. 9, Conduit-street, Mr. J. Macvicar Anderson, President, in the chair.

The President stated that an Intermediate Examination, to qualify for registration as student, was held on the 14th and 15th inst., and that out of 25 probationers who applied, 21 were admitted, 20 of whom presented themselves, and were examined. Of these 15 passed, and the remaining 5 had been relegated to their studies. The 15 placed by the Board of Examiners in order of merit were as follows:—Walter Brand, Ipswich; Howard John Wonacott, 280, Lordship-lane, S.E.; Edward Tylee, 29, Oxford-square, W.; Frederic Snowden Hammond, 1, Circus-place, E.C.; George Oakley Scorer [Lincoln], Abercorn Lodge, Upper Hamilton-terrace; Frederick Chatterton, 14, Hill-marton-road, Camden-road; Richard Harold Smith, Redland, Bristol; Osgood Smith, 87, Hanley-road, Crouch Hill; Edward Napier Hitchcock - Spencer, Ashwell, Herts; David Horn, 95, Fitzjohn's-avenue, N.W.; James Jameson Green, West Kirby, Cheshire; Edgar Felix Ware, Exeter; Samuel Percy Andrews, Hertford; Frederick Thomas Grant, Maidstone; Jeremiah Joseph Meagher, Rathmines, Dublin.

These gentlemen had been registered as students, thereby increasing the number already on the register to 83, as against 41 last year, and 17 in 1891.

The Secretary, Mr. W. H. White, then read the paper by Mr. E. Falkener, on "The Grecian House as described by Vitruvius."

Mr. Falkener observed that he had been asked to give a paper on a Pompeian house, but as Pompeii was a Roman province, it was desirable to consider whence Pompeii derived its architecture, and he thought it would appear that the Roman house had its origin from Greece, not from Etruria. In the first place, the maritime cities around the Bay of Naples, of which Pompeii was one, were of Greek origin, and, in fact, the Greek language was predominant in Southern Italy till after the fall of the Western Empire; the greater part of the MSS. found in Herculaneum were Greek, and after the conquest of Greece there was a constant immigration into Italy of impoverished artists, sculptors, architects, and others, through whom Greek taste and refinement were introduced into Italian houses. Vitruvius thought it looked well to go back to the remote Etruscan epoch for the origin of the Roman house, and fancied the word *atrium* to have some connexion with Atria, which gave its name to the Adriatic Sea; but if it were of Etruscan origin, why should it take its name from a city on the northern frontier? There were no remains of an Etruscan house, and the Etruscan tombs suggested nothing in common with Vitruvius's description of a Roman house. The paper then went into Vitruvius's description of the Roman house, illustrated by the plan of the house of Pansa at Pompeii, which answered so precisely to the description of Vitruvius that he might have been the architect of it. Mr. Falkener then passed to Vitruvius's description of a Grecian house. On this head, not having been in Greece, he was dependent for information on various Greek friends, of whom he mentions sixteen in the Introduction to his Sixth Book. These sixteen might each have contributed one item to the account, and Vitruvius might have consigned them together a good deal in noting them down. Mr. Falkener proceeded to analyse the result of the description of the Grecian house as obtained from the disjointed statements of Vitruvius. The most noticeable difference between this and the Roman house was that according to Vitruvius the Grecian house had no atrium, whereas the atrium, varying in

* See documents of Mediaeval chantries.

† T. E., v., lii., p. 121, &c.

size with the size and importance of the dwelling, was the most characteristic and indispensable apartment of a Roman house. A plan was given of the Grecian house as described by Vitruvius, showing a large vestibulum surrounded by a colonnade, a pillared *aula* beyond, entered by a narrow passage between the *tabernæ*, and with smaller *aulæ* for guests on each side, and ending in a smaller apartment called the *prostas*, on either side of which were the *thalamos* and *amphithalamos*. This *aula* or peristyle was called the *andronitis*, because the men carried on their affairs there uninterrupted by the women. Through the *prostas* was reached the peristyle proper, with a fountain in the centre within the colonnade, and projecting bays or *aci* to right and left. This was the *synagoge* to which the women had free access. The vestibulum was evidently a large, fine court, being described by such epithets as "magnificent" and "royal"; but Vitruvius seemed to have made the mistake of limiting it to the small open lobby in front of the door, whereas in reality it was probably a *cortile* or courtyard. The peristyle of the Grecian house seemed to have been practically what Vitruvius calls a Corinthian atrium, but with a colonnade round three sides only, the fourth side being occupied with the wall and pilasters of the *prostas*, and it had no *alæ* on either hand like the Roman atrium, and no impluvium; hence, not unnaturally, Vitruvius did not recognise it as an atrium, and said the Greeks had no atrium; but in the essentials of an atrium, in being a colonnaded chamber, open in the centre, it resembled the Roman apartment so called. The *thalamos* in the Greek house was placed just where the Romans placed the *hymeneal* chamber; the peristyle in the rear, called by the Greeks the *gynæceia*, corresponded with the peristyle and its adjacent apartments in the Roman house, called by Vitruvius the private portion of the house. It was not to be supposed however in either case that the women slept on the ground floor. Even in the Homeric period the Greek women had their upper story, their *υπερῶν*, and similarly the Roman women had their *cenaculum* on the upper floor. Another feature of the Grecian house was the small suites of apartments for guests, called by Vitruvius the *hospitalia*, on each side of the *aula*, and connected with it and with each other by a passage called the *mesaulos*, sometimes erroneously confounded with the entrance of the *aula*. Now, *hospitalia* of the same description were found in Pompeian houses, of which an example was shown in the plan of the "house of the great fountain," about which also the author made some interesting remarks in regard to the alterations and gradual cutting up and re-arranging of the property which could be traced from the remains. Thus we found the Roman house was copied from the Greek house; the vestibulum was in common; the prothyron of the Greeks became the ostium of the Romans; the diathra of the Greeks the prothyron of the Romans; the *aulæ* became the atrium; the hypæthron the compluvium; the *prostas* the tablinum; the *thalamos* the lectus genialis; the *metaulos* the fauces; the hyperoon the *cenaculum*; and the peristyle, *xystus*, *triclinium*, and other parts were in common. The paper concluded by a kind of postscript on the subject of the hypæthral temple, arguing that all objections to this view of the Greek Temple only served to confute one another; and that as our churches were lit in the same manner as our houses, so the Greek temples were lit in the same manner as their abodes, the hypæthral opening of the atrium having its counterpart in that of the temple.

In the discussion which followed,

Mr. F. C. Penrose said the subject was not one he had particularly studied, but with Mr. Falkener's representations the subject really received a great measure of light, his analysis of Vitruvius's derivation of the Greek house being quite admirable. It was evident that the Greek house, of the period that Vitruvius spoke of, was derived by direct evolution from the earliest houses mentioned by Homer, and such other authorities as might be brought to supply an account of these early houses. In the account of the house of Ulysses, in which a great part of the action of the *Odyssey* took place, a good deal could be made out, and no one had thrown more light upon it than Professor Jebb had in his account of the Homeric times. The Professor devoted a chapter to a description of the Homeric house, which was well worth reading. In that case it was evident that the entrance was by a door into the court-yard, in which a series of things

took place. The oxen were brought there to be slaughtered, and it was what in the North of England would be called a "crew-yard." Then, luckily, at Tiryns there were houses of the period, remaining in their foundations to a great extent, and though these had been rather interfered with by more recent structures, still the main conception of the house could be made out. He understood that Mycenæ and Troy supplied some further illustrations, but the house at Tiryns was the great text by which the account in Homer could be assisted. It was not identical with the account in Homer, but the entrance there was in a court. He then proceeded to the portico and to the *aula*, or large paved court, with pillars on each side, representing distinctly the *aula* in which the suitors of Penelope were accustomed to carouse. It was there that Ulysses standing on the threshold, was able to shoot his arrows to destroy them. In the case of Tiryns it was apparent, though not certain, that the house of the women was on the side, while in the Homeric house it must have been at the back. It was curious that the only illustration we have of the Greek house was from that early period, and it might be hoped that more light would be thrown on the subject by future excavations. We have by no means got everything which could be discovered in that way, and some veritable plans of the later period of Greek times might be unearthed at such a likely spot as Ephesus. There, a great part of the city had been covered with mud, by the river, to a depth of 20 or 30 ft., so that it was extremely hopeful that some day a Greek house of the fourth or fifth century B.C., or even of a later date, might be brought to light. He should be very sorry to attack any one of Mr. Falkener's points on the subject of his interpretation of Vitruvius, and as to the Greek or Roman houses, because in the case of the Roman house he was on safe ground, having the houses at Pompeii to work on. With regard to what Mr. Falkener had said subsequently, on the matter of the hypæthrum, it would be prudent to reserve any remarks on that subject until after the Greek and Roman houses had been discussed. He had pleasure in proposing a vote of thanks to Mr. Falkener for his admirable paper.

Dr. Murray said he understood that one of the chief points in Mr. Falkener's argument was the identity of the Roman atrium with the Greek peristyle. That seemed to be one of the important parts of the question, and he seemed to say it had been strongly disbelieved; but in the book he (the speaker) was accustomed to refer to, viz., the German book of Nissen, the author pointed out the similarity of the Roman atrium to the Greek peristyle. That author set to work in a different way to Mr. Falkener. He did not trouble with the later house of Pansa, and others of the sort, but went back to numerous remains of the small limestone houses in Pompeii of one story, each with a single court and chambers round it. These houses he traced back to about 300 B.C., and got away out of the atmosphere of Vitruvius. A rich man who had a little house, kept his original atrium, turned his neighbour's atrium into a peristyle, and might go on acquiring house after house, but always adding a new peristyle, not a new atrium. As to the derivation of the word "atrium," they knew that the Greek word *μῦαθρον* was substantially the same word as the Latin "atrium." He did not think there was any other point he could follow with advantage, except the identification of the atrium with the peristyle.

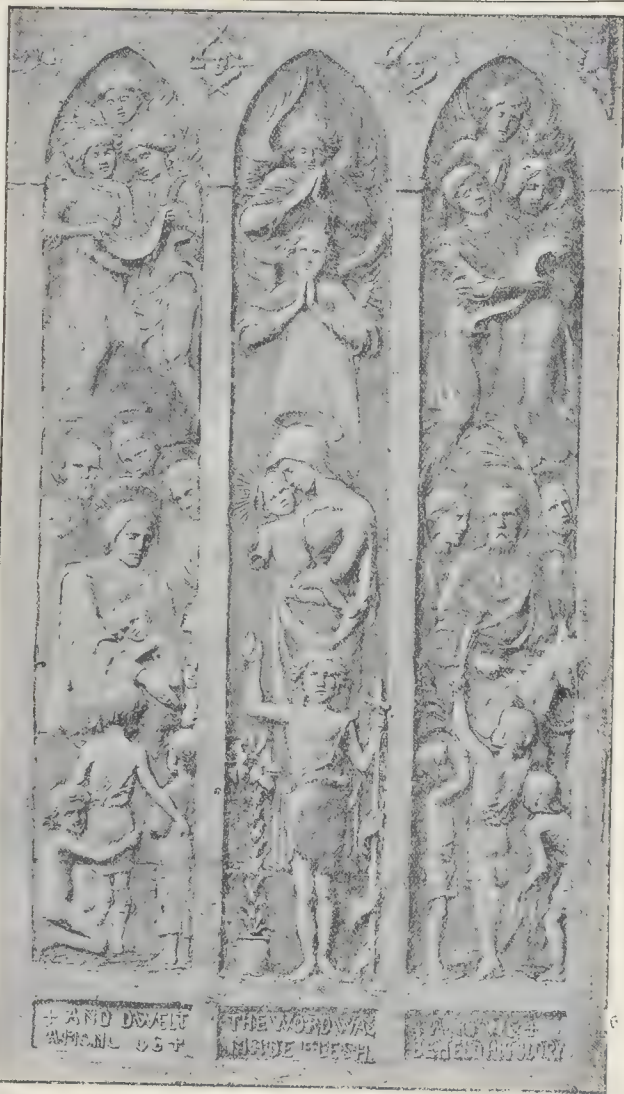
Mr. E. P. Loftus Brock said he had much pleasure in seconding the vote of thanks to Mr. Falkener. Within the last three or four years, Dr. Flinders Petrie had brought to notice several ground-plans of Egyptian houses, showing many points very similar to those referred to that evening. There was also in one of the plans a very curious arrangement of access to the women's apartments, the men appearing to have one entrance, and the women another.

Professor Aitchison said as far as the Roman house went he had very little to say, as it was so well known, although one would like to know more about the exact uses to which the rooms were put. There was one little point he might notice, and that was the use of the words *compluvium* and *impluvium*. As far as he had been able to make out, they both meant the same thing, viz., a skylight. When one spoke of a skylight now, one generally meant a frame with glass in it, but it really meant a hole in the roof, just as in the case of the great eye in the dome of the Pantheon. It was, however, supposed that glass was occasionally employed. He believed that *impluvium* was the literary term, which writers of eminence used, but Vitruvius, being an

architect, no doubt knew the technical term, and used the word *compluvium*. In a play of Terence the word *impluvium* was used as the place where Jupiter came in, and it was most distinctly stated that his plays were translated from the Greek. In Plautus' plays this opening was called the *impluvium*, but these plays might be like some of our own plays, which were adapted from the French with English habits put in place of French ones. Wilkins, when he found something in Vitruvius which did not agree with his preconceived opinions, said it was evidently a mistake made by some ignorant scribe in copying the work. Mr. Falkener, however, had gone further and had said that Vitruvius himself knew nothing about it. They might hope that an illustrated edition of Vitruvius might turn up some day from some place hitherto unexplored, or that they might find some city which had been overflowed by a river, as Mr. Penrose had said, Sybaris, for example, with ruins of sufficient extent to show what the houses of Vitruvius' time were like. Mr. Falkener had allowed himself a rather free hand in the matter, but, at the same time, they were very much obliged to him: for this Greek house had been an exercise for architects from time immemorial. As Mr. Falkener at the end had reverted to his theory about the lighting of Greek temples, the speaker was bound to say something about it. The hypæthral temple they must admit, because Vitruvius distinctly said that there were temples erected to Jove, to lightning and to the heavens, to the sun and to the moon, which were open to the sky; and it was known that the Kaaba at Mecca was originally hypæthral, being covered in the days of Mahomet. But Mr. Falkener's theory was quite different. He said they knew there were hypæthral temples, and that as Vitruvius gave no account of the lighting of temples not hypæthral, they were consequently all hypæthral. The speaker did not quite follow that logic. No doubt many of the theories mentioned by Mr. Falkener were made on the spur of the moment, but it was not to be supposed that men like Mr. Penrose and Dr. Dörpfeld, who were the greatest authorities on such subjects, had not made a careful study of all the literature on the subjects and of all the examples they had an opportunity of seeing. They were much indebted to Mr. Falkener for his paper and for the trouble he had taken about the Roman and Greek houses, and also for again drawing their attention to the vexed point of the lighting of the great temples.

Mr. Penrose said he had reserved any remarks he had to make on the hypæthral temples until after the question of the Greek houses had been dealt with. Professor Aitchison had anticipated nearly everything he had to say, but it was more than clear that Vitruvius, whether or not he was accepted as a guide in anything he described, gave an honest record of evidence on the subject. Therefore, when he told us that there were temples of various kinds, calling one of these kinds only, hypæthral, we should suppose from his description that the temples of smaller size were not hypæthral. We were left to consider then how the temples could have been lighted without this skylight. The doors were very large, and would, no doubt, admit a great deal of light, when the sun was rising in their direction. Vitruvius gave the hint that on those occasions, when the worshippers were making their orisons at sunrise, the gods would appear to rise from their seats, and that was just what a person in a state of religious ecstasy might fancy, for, when the sudden sunrise struck the statue, it would appear to enlarge, and almost to rise. That was in favour of the idea, that generally speaking, the sun coming in at the eastern door shone upon the statue, and that that was the main lighting of the temples. Again, in the case of the crys-elephantine statue, it would be impossible to keep it from the rain, if there were a large opening of the kind. The deluges of rain which fell at Athens were very great—in fact, he remembered once, when at the Temple of Jupiter Olympus at Athens, before the ground was made up as it was now, a sudden rain formed quite a large pond of some depth in front of the temple. Such a shower, therefore, would have fallen on the statue, or near it, and injured it to a great extent, if it were only protected by awnings. It was, therefore, clear that, where elaborate statues were introduced, they must have been protected by a roof from the elements.

Professor Aitchison added that when Pausanias spoke of visiting the interior of the Parthenon and the Temple of Jupiter Olympus at Olympia, he mainly confined his description of the inside to the statue and its pedestal, which rather looked as if he got the best light there.



Panel for an Altar Piece. By Miss E. M. Rope. (In the Arts and Crafts Exhibition)

Mr. H. H. Statham said that he had come to the meeting with the distinct intention of making a protest against the insidious postscript which he believed was the *œuvre* of Mr. Falkener's learned and interesting paper; the argument being this: The Roman atrium had an opening at the top; the Greek, having an opening in the top of his own house, would be likely to put one in the top of his temple. As to the arguments against such an arrangement as was shown in Mr. Falkener's illustration, Professor Aitchison and Mr. Penrose had said nearly all that need be said; but there was one very striking argument which Mr. Penrose omitted to mention, and with which his name had been connected—viz., the very much increased importance which had been given lately to the idea of orientation not only of the Egyptian but of the Greek temples; and, of course, if the temples were specially built so as to be orientated, that immediately connected them with the idea of being lighted by the rising sun, and furnished a reason why a door might have been

considered sufficient without any other means of lighting. There was another point he had noticed in several discussions that had been reported on this subject at different times. Over and over again, in discussing the subject of hypæthral lighting, people referred to Pausanias' description of a temple, and said "Pausanias says nothing about the lighting." But surely it might have occurred to people that if Pausanias often spoke of temples, and said nothing about the lighting, it was because there was nothing to say. He thought that was a strong argument in favour of the idea that these temples were really lighted from the door and not from any windows, the position of which none of us could arrange satisfactorily. And he wished to enter a protest against that illustration in Mr. Falkener's paper from another point of view. Mr. Falkener complained very truly of the terrible trench which the late Mr. Fergusson cut along the roof of the Parthenon at each side, which, from any position, must have been the greatest eyesore, not to speak of the fact that there was no sort of coin representation of anything of the kind. But if Mr. Falkener objected to Fergusson's longi-

tudinal trench, he (the speaker) objected just as much to his slash across the roof. How would it look from the outside? A great piece cut off from the middle of the roof! And from the inside it had the most commonplace and ill-considered appearance; it looked like an afterthought, and he should entirely refuse to believe that the Greeks could have treated such a building as the Parthenon in such a way, even supposing they wanted to light it from the top, which most people now agreed they probably did not. He had understood from the Secretary that Mr. Falkener's drawing of the interior of the Parthenon, lighted in this way, was to form the frontispiece to the next volume of the *Transactions*. He hoped that would be reconsidered. Put in its proper place as an illustration to the paper it would be all right; but if used as a frontispiece many readers would imagine that the Institute were giving their sanction to an idea which was now quite out of date.

Professor Kerr remarked that the house of Pansa, as delineated on the screen, gave a very striking illustration of the origin of the Latin house. The difference between the Latin and the Teutonic house was radically this—that the Latin house surrounded a court, while the Gothic or Teutonic house surrounded a hall. There was no hall in the Eastern or Greek house. They would observe that the central feature of the plan was the peristyle, which was a courtyard open to the sky, with the exception of a colonnade round it. In order to find access to the central apartments, there was in the house of Pansa the atrium, or what might be called the entrance-hall, shown in Mr. Falkener's Greek plan. This idea was supported by what Mr. Penrose had said, the outer courtyard corresponding to our forecourt. Then, at the back was the garden, and between the garden and the peristyle was, in the house of Pansa, what he took to be a triclinium. In the Greek house, Mr. Falkener referred to the Cyzicene triclinium, which was a room opening upon the garden on three sides, and appropriated to the eastern or southern *menage*, as distinguished from the Gothic plan which we follow, and of which the hall was the central feature. It seemed to him that this plan of the Roman and Gothic house was very instructive. The same idea was still carried out by the Spaniards, French, and Italians to the present day, whereas all the Teutonic nations described the court entirely as a living and covered hall.

The President, in putting the vote of thanks to the meeting, said that it seemed to be impossible to deal with Greek architecture without turning to the problem of the hypæthral temple. He drew attention to Mr. Falkener's beautiful drawings, and hoped the vote of thanks would include Mr. White, who had so well read and explained the paper.

The vote of thanks was then put, and carried by acclamation.

Mr. Phene Spiers said that he understood that Mr. Falkener had made a large number of drawings in Egypt and Greece, but he had never heard that those drawings had been exhibited. If, as a sequel to this paper, Mr. Falkener would consent to allow some of his drawings to be exhibited, they would be of great advantage and interest, especially to students.

The President announced that the next meeting of the Institute would be held on December 4, and would be a business meeting.

The proceedings then terminated.

PANEL FOR ALTAR-PIECE.

THIS bas-relief, executed by Miss I. M. Rope, is intended as a suggestion for a panel in an altar-piece, or possibly to be worked out on a much larger scale in the manner of the Della Robbia reliefs which fill the whole end of a chapel near Siena. The words are meant to be illustrated from a child's point of view.

The panel is exhibited at the Arts and Crafts Exhibition.

SALE OF PROPERTY, FLEET-STREET. The freeholds of Nos. 83-4-5, Fleet-street, will shortly be offered for sale by auction. No. 85 is well-known as the offices of our contemporary *Punch*. It stands at the corner of St. Bride's-avenue, a thoroughfare which was made under the superintendence of J. B. Papworth, architect, after the fire of November 14, 1824. Until that time some houses in Fleet-street intercepted a view of the church. In his "Curiosities of London," Timbs says this improvement cost 10,000/.

LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday at the County Hall, Spring Gardens, Mr. John Hutton, Chairman, presiding.

Fair Wages.—The adjourned report of the Special Committee on Fair Wages Clause in Contracts was considered. The Committee reported as follows:—

"We have to report that we have, in pursuance of the reference from the Council on December 16, 1892, considered the questions raised by the following motion and amendment:—

"Moved by Mr. Ward, seconded by Mr. Benn.—That the following additional standing order be made:—Where there is no trade union to fix the minimum wages, in any trade in London the Council shall itself fix the minimum rate of wages to be paid."

"Amendment moved by Mr. F. Harrison, seconded by Mr. Costelloe. That the following be added to the motion:—'But there shall not be entered in the Council's list any rate of wages less than 6d. per hour for men, or any hours of labour more than ten hours per day.'"

We are of opinion that there should be a standing order to the effect moved by Mr. Ward, but that its scope should be extended to include the hours and conditions of labour as well as the rates of pay, and that its operation should not be restricted to London. We think the addition of the words suggested in Mr. Harrison's amendment is rendered unnecessary by the fact that the Council has, on the recommendation of the Works Committee, adopted a list of rates of wages and hours of labour, framed after consultation with the trades unions and employers of labour, the minimum rate of wages in which is 6d. per hour, and it appears to us undesirable in framing such a standing order as that proposed in any way fetter the discretion of the Council. Our recommendation is therefore:—

"That the following additional standing order be made:—Where there is no trade union to fix the minimum wages in any trade, the Council shall itself fix the minimum rate of wages to be paid, the maximum hours to be worked, and the conditions to be observed."

With this recommendation we complete the discharge of the references which have from time to time been made to us by the Council."

Mr. A. Arnold moved an amendment to insert the words "in London" after "wages in any trade." There were, he said, about 10,000 trades in the country, the majority being outside London; how, therefore, would it be possible to carry out the recommendation?

Lord Farrer seconded the amendment. The resolution proposed, he said, that they should fix for themselves the minimum rate of wages, the conditions and the hours of labour for every article they were going to buy. The resolution would fetter whatever committee had to carry it into effect, and would, in fact, be an impossible task.

The amendment having been negatived after considerable discussion,

Sir John Lubbock moved that the words "rate of wages recognised, and in practice obtained," be substituted for the words "the minimum rate of wages to be paid."

The amendment having been accepted,

Mr. Doake moved, and Mr. Hubbard seconded, to add the following words:—"but in London, no rate for men shall be less than 6d. an hour."

Sir J. Lubbock said that if the amendment were adopted, they would greatly enhance the difficulty of any man who had had the misfortune to meet with an accident obtaining employment.

The amendment was ultimately negatived, and the recommendation of the Committee, as amended, was agreed to.

Keeping of Waterloo Bridge.—The Works Committee were granted powers to close Waterloo Bridge while it is being paved with wood. Captain Probyn suggested that the bridge might be repaved in longitudinal sections, traffic being allowed to pass over the bridge, and so prevent the block of traffic in the Strand; but Mr. Lyon, the Chairman of the Committee, said that the work could be more expeditiously done in the manner suggested. It would be carried on night and day.

Locomotion in London.—The Public Health and Housing Committee reported that they had under consideration the best means of obtaining information on the question of locomotion in London, including railways, tramways, omnibuses, and steamboats. They recognised that the subject was one of supreme importance from sanitary, social, and commercial standpoints. The population and area of London being far beyond that of any other city, the distances to be covered were so great that travelling facilities had become a necessity for all classes. The large increase of value which had taken place in business premises made it essential to provide house accommodation on cheaper land than was available in business

localities. Moreover, from the great extension of industrial establishments, it had become physically impossible to provide house accommodation in the neighbourhood of their employment for such multitudes as were now engaged in the industries of London. From a health point of view the question was equally pressing. The mean death-rate in different groups of districts of the Metropolis, during the seven years ended 1891, was as follows:—

	Persons per acre.	Mean death rate.
Districts with a density of under 40.....	15.27	189.91
" " " from 40 to 80.....	19.04	
" " " 80 to 120.....	19.24	
" " " 120 to 160.....	22.90	
" " " over 160.....	23.88	
County of London }	57.....	199.90

The erection of model dwellings had done much to improve sanitation, yet there was no known method by which population could be crowded as in London without danger to health and loss of life. Additional air space was essential, which could only be given by extending the area of occupation. This was impossible within the business limits of London; room must be sought outside the limits, and improved means of locomotion provided. They found that there was increased difficulty in re-housing the working classes displaced by housing schemes. It was rarely possible to satisfactorily re-house more than half the number displaced. This was a great hardship to the workman whose work lay in London and inevitably led to overcrowding in the neighbourhood of the area which was the subject of a scheme. It could not be doubted that the above-mentioned evils might be obviated or at any rate lessened by cheap and rapid transit to and from the suburbs, where land was cheaper and not over-built. The chief reliance for relieving London from overcrowding must be upon railways. Tramcars, omnibuses, and steamboats, were, however, essential parts of a general system of locomotion, and should be considered in connection with railways. The improvements which had recently been made in the construction of railways opened up opportunities which should be utilised on a general system for passenger railways throughout the metropolis and adjacent country districts. The Council might well be provided with a general outline of a scheme to develop a considerable extension of cheap railway transit. They believed the best and only means of obtaining the information for the purposes of a complete report was by engaging the services of a skilled engineer who would go thoroughly into the matter. It might also be necessary to employ a competent surveyor. They believed that might be done for about 500*l.*, and they recommended accordingly. The recommendation was agreed to.

Appointment of District Surveyor.—On the recommendation of the Building Act Committee, Mr. B. Dicksee was appointed district surveyor for East Newington and part of St. George-the-Martyr, Southwark.

The Shaftesbury Memorial Fountain.—The Improvements Committee reported that the Shaftesbury Memorial Fountain had been considerably improved by the lowering of the surrounding wall, and they sought permission to remove it altogether. The recommendation, however, was referred back.

Another Open Space.—The Council agreed, on the recommendation of the Parks Committee, to contribute a sum not exceeding 2,000*l.* towards the cost (6,400*l.*) of acquiring as an open space about 8 acres of land at Manor-lane, Lee.

After transacting other business the Council adjourned soon after 7 o'clock.

A VETERAN SURVEYOR.—Mr. Henry Cooper, the senior partner of the firm of Messrs. Henry Cooper & Sons, Quantity Surveyors, Reading, who has been continuously employed in the practice of his profession more than fifty-six years, originally measured up the work in various bridges on the main line of the Great Western, when they were built in 1837, and has recently been engaged in again measuring up the work on these same bridges, which have been reconstructed or widened now that the railway has been converted from two tracks to four tracks.

PROPOSED ELECTRIC LIGHTING OF CHELTENHAM.—On the 14th inst. an inquiry was held by Colonel Hasted, R.E., Local Government Board Inspector, at Cheltenham, into the application by the Corporation for leave to borrow 16,000*l.* for the purpose of electric lighting in the borough. The Borough Surveyor (Mr. J. Hall, C.E.) afterwards gave estimates, and explained the scheme of lighting, which is to be the alternate current system, as recommended by Professors Ayrton and Preece.

ARCHITECTURAL SOCIETIES.

MANCHESTER SOCIETY OF ARCHITECTS.—In connexion with the Manchester Society of Architects a conversation was held on Tuesday at the Literary and Philosophical Society in George-street. The President of the Society, Mr. E. Salomons, who took the chair, spoke of the importance of architecture, and said he thought it was most desirable that the public generally should have a little more knowledge of what architects did, and what architecture was. A great many people seemed to think that an architect was a sort of superior builder. If the public only desired better houses they could have them. The question of cost, he was afraid, always seemed to get into the way, and the assistance of an architect was not sought. If the public only tried it, he thought they would be surprised to find that it was in the end cheaper to employ an architect and get a really good house. The Mayor of Salford, Mr. Alderman W. H. Bailey, said he thought it would pay if a society like the Manchester Society of Architects got up a subscription and sent the Corporations of Manchester and Salford to Holland, Germany, up the Rhine, to Nice, and to Monte Carlo to see the beautiful places and the beautiful houses in which people lived. The contrast between the houses in the back streets of Manchester and Salford and the beautiful little cottages in Holland was very great. Architects owed a great duty to the public in trying to cultivate a taste for beautiful houses.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—The eighteenth session of this Society was opened on Monday at the Law Institute, Albion-place, Leeds, when Mr. George Bertram Bulmer, F.R.I.B.A., who for the second time has been elected to the presidential chair, delivered his address. Their Society, said the President, was established for the promotion of honourable practice and the education of pupils, and he urged his fellow members to keep this two-fold character of their constitution in mind. An architect must take his fee, and therewith be content, he said, otherwise bribery and corruption would enter in; and it was for the public to see that a sufficient *quid pro quo* was offered for services confidential and skillful. It was also for the architect to see that his fee was sufficient, so that there might be no possible excuse for accepting commission other than from his client.

If public bodies forced upon them competition in fees, their "practice" would then, he feared, become "business," of which "Diamond cuts diamond" was the motto. Let the Society foster the principle of "Architecture a profession and an art." The etiquette of the profession should also be observed. He trusted all the provincial societies would join with the R.I.B.A. in controlling irregular proceedings. As to theoretical knowledge, they were likely to have no lack, for, as a means to that end, the parent body had this year carried into effect a plan of dividing the country into provinces, each having an allied society as its centre. This division into districts was primarily for educational purposes, but co-lateral advantages would ensue; for through the allied societies the Institute would be able to regulate more stringently the practice of its members, and circulate for consideration any proposed reforms for increasing its own efficiency. One could not but believe that the R.I.B.A., having established compulsory examination, and divided the country into educational districts, would complete the machinery by forming a system of educational classes, with certified instructors, in the various parts of the country where students most do congregate. Referring to the laying out of City Square, he regretted that the solution of the problem was still in the repose of the unknown. He hoped that the matter would be placed in competent hands. In reference to the smoke nuisance, the President suggested as a means of abating it that every smoke flue in a house should be connected to one shaft where the smoke could be dealt with scientifically, and the more easily so in cases where the dwellings were erected in one block. With regard to the advertising nuisance, it was no chimera to suppose that a large part of the present extravagant advertising could be swept away. Edinburgh and Aberdeen did not tolerate coarse placards and unsanctified hoardings, nor did Paris and Rouen. Speaking of architectural art, he said it was not a mere trick of the pencil, but must be based on sound principles, which were the expression of a logical reasoning faculty, if it was to satisfy the intellectual observer. In erecting a building of importance, the work of many crafts had to be introduced, and it was the duty

of the architect to secure, as far as possible, complete harmony amongst those by designing all the details himself in every trade, or by exercising a power of selection which could only be arrived at by long and severe training, else his work would become a museum of crafts, and not a homogeneous work of art. A vote of thanks was accorded to Mr. Bulmer, on the motion of Mr. W. Watson (Wakefield), seconded by Mr. W. J. Meitum (Leeds). The prize offered by the Society for design was awarded to Mr. T. D. Brooks, and that for construction to Mr. C. W. Tomlinson. There was no competition for the silver medal.

CARLISLE ARCHITECTURAL ENGINEERING, AND SURVEYING ASSOCIATION.—At the meeting of this Association, held on the 15th inst., in the Town Hall, a lecture was given by Mr. F. J. Nichols, C.E., on "The Laying and Joining of Sewer-pipes." The various forms of sewers and the materials used in the manufacture of pipes and laying of sewers, as also the necessary timbering required in the trenches, according to the nature of the ground, were fully explained; and the lecturer concluded with a description of some of the many forms of joints to sewer-pipes with the relative advantages and disadvantages of each. The lecture was amply illustrated by diagrams and models.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The opening meeting of this Association for the present season was held on the 15th inst. in the Royal Institution, Edinburgh, Mr. W. Robertson, President, in the chair. Previous to undertaking the business of the evening, the President made a feeling reference to the death of Mr. John McLachlan, architect, which had occurred since their last meeting. For a long number of years he had been a member of the Association; he had at one time been President, and had always been anxious to do anything in its interests. The President then delivered his opening address, taking as his subject "Holyrood Abbey and Palace." He said he had not selected the subject because he had much that was new to tell them about Holyrood, but because, in his opinion, the building was the most interesting in all Scotland. Mr. Robertson's address was illustrated by means of fine light views, and the first being displayed, he said they would observe there were three buildings, each differing from the other in character, age, and history. The first was the ruined fragment of the old Abbey; the second, the solid tower of the old Palace built by James IV.; and the third, the Palace built by Charles II. The ruins of the Abbey were then dealt with and examined in detail, both from the outside and inside, and a short historical sketch of the Abbey was given from its foundation by King David in 1128 at the foot of the Castle rock, through the period when it declined to the position of a parish church, down till the present time. The richness in the variety and detail of the architecture were entered into and explained. Dealing with the Palace, slides were shown of the quadrangle, as well as of some of the oak ceilings and mantelpieces in the interior of the building, and the address was concluded by the exhibition of a number of old plans of the building and its adjustments. Mr. Robertson was awarded a hearty vote of thanks for his address.

THE GLASGOW SCHOOL OF ART.—The second lecture of a series on "Italian Architecture," by Mr. W. J. Anderson, A.R.I.B.A., arranged for by the directors of the Glasgow School of Art, was delivered on the 15th inst., in the Corporation Galleries, the special division treated of being the Early Christian and Medieval Architecture of Italy.

THE SANITARY INSTITUTE.—At an examination for Inspectors of Nuisances, held at Newcastle-upon-Tyne on the 10th and 11th inst., 1893, twenty-five candidates presented themselves. The following candidates were certified as regards their sanitary knowledge, competent to discharge the duties of Inspectors of Nuisances:—Percy A. Aubin, St. Heliers, Jersey; William Ellwood, Brigham, Cockermouth; John Hedley Mole, East Boldon, Newcastle-upon-Tyne; John Gill Mulse, Kilmarnock; William Carnegie Orkney, Moncrieffie, Perth; Charles Robson, North Shields; Hugh Daniel Rugg, Poplar, London, E.; George Symon, Newcastle-upon-Tyne; Fred R. Turnbull, West Hartlepool; and Marmaduke Temple Wilson, Alnwick.

SCHOOLS, WOLVERHAMPTON.—On the 14th inst. the memorial stone was laid of the new schools in connexion with St. Luke's Church, Blakenhall. The new building, which adjoins the present schools, is intended to serve as a boys' school, and when completed will accommodate about 130 scholars. Inside it will measure 70 ft. by 22 ft. The builder is Mr. H. Gough, of Wolverhampton, and the architect is Mr. F. T. Beck.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The opening meeting of the Session was held on November 15, Mr. Allon Wyon, F.S.A., Treasurer, in the chair. Mr. R. Quick exhibited some interesting antiquities recently found in Egypt, among which was a finely-carved face in sycamore wood. Mr. Oliver described the brass of William Brian, ob. 1395, at Seal, Kent. The monument is in perfect condition, and the figure is represented in plate armour. Mr. Loftus Brock, F.S.A., reported that the recent demolitions close up to the Roman Bath, Strand-lane, had not revealed any evidence of Roman work adjoining to it on any part of the south side. Mr. Cecil Davis described the curious seat in St. Nicholas Church, made for the craft of Bakers—"Baxters" in 1607. It is remarkable for having each of its panels filled with a merchants' mark. A full-sized drawing was exhibited. Mr. J. M. Wood described some excavations now in progress for the waterworks supply at Colchester, and exhibited a large collection of fragments of Samian ware, ornamented with figures of gladiators, &c., which were found during the progress of the works. The first paper was on the Parish Church of Leeds, Kent, by the Rev. J. Cave Browne. The fabric is an interesting building containing some good features of Norman work, but in the recent restoration several Saxon windows were found, each having deep spalls inside and out. Some of the masonry is formed of what has been called tufa, which proves to be a light deposit of lime which is dug in the locality. The fine screen, now partially restored, was described by Mr. Saunders, who exhibited a drawing showing it in its perfect condition. Several photographs of the church were also exhibited. The fabric is close to the site of Leeds Priory, of which there are no remains visible above ground, but the church was shown by documentary evidence to be of earlier foundation. The second paper was on Merchants' Marks, by H. Syer Cumming, Esq., F.S.A. (Scot.). The history of these curious signs was traced, and the paper was illustrated by sketches of various examples, most of which were found either in the River Thames or in excavations on the site of old Steelyard in Thames-street.

COMPETITIONS.

BOARD SCHOOL, BOLE HILL, NEAR SHEFFIELD.—At the usual monthly meeting of the Sheffield School Board, on the 16th inst., the Buildings Committee reported that they had examined twelve sets of plans and designs submitted by Sheffield architects in competition for the proposed school at Bole Hill, and they had also considered the report of Mr. Robson, the adjudicator. The committee recommended that the plans marked "Toledo" be accepted and adopted, and that the premiums of 15*l.* and 10*l.* offered to architects other than the author of the accepted plans, whose plans were considered second and third in the order of merit, be awarded to the authors of plans marked "Standard" and "Bell Hag," provided that they fulfilled the conditions, but that in the event of there not being "other architects," as set forth in the instructions, the awards be made either to the author of plans marked "Artemis" or the author of "Spot in Circle."—Mr. Adams moved as an amendment that the plans marked "Artemis" be accepted. The Rev. T. W. Holmes seconded the amendment; but it was defeated, and the Committee's recommendation adopted. It was then announced that the accepted plans were those sent in by Mr. W. J. Hale. The plans marked "Standard," and securing the award of 15*l.*, were submitted by Mr. C. J. Innocent, and the 10*l.* award was given to the "Bell Hag" plans, which were sent in by Messrs. Hamsoll & Patterson.

A SMALL-PON HOSPITAL FOR LEEDS.—At a meeting of the members of the Sanitary Committee of the Leeds Corporation on the 17th inst., it was determined to ask the Council for a grant of 9,340*l.* to enable the committee to build a small-pox hospital at Manston. Plans of the proposed hospital have been prepared by Mr. Thomas Hewson, the City Engineer, under the direction of Dr. Cameron, the Medical Officer of Health, and the sub-committee which was appointed to visit similar institutions in various parts of the country. It will be on the pavilion system, one story high, with a ward at one end for males and at the other end for females, the two divided by the nurses' department, &c. Altogether there will be thirty beds for patients, and twelve for those connected with the administrative department.

Illustrations.

DESIGN FOR THE COMPLETION OF SOUTH KENSINGTON MUSEUM.

WE give the perspective view and ground plan of the design submitted by Mr. W. Emerson in this important competition. The plan shows that the general idea of this design was to carry forward the centre lines of the present buildings as far as possible, keeping the main entrance in the middle of the south front, and set back in an arched courtyard between two projecting wings, the entrance opening into a large octagonal court with galleries right and left leading to the wings. The east wing contains galleries and a large covered court, centering with the present lofty architectural court in the rear. A west wing to balance contains galleries and two large covered courts, with an octagonal staircase at the south-west corner at the junction of the Cromwell and Exhibition-roads. This staircase disguised the angle so as to get the long flank of the building parallel with the Exhibition-road—an important point, as anyone coming from Hyde Park would see nothing but the corner of the building if kept at right-angles with the main front, as done by some of the competitors.

It was thought that the additions should be more or less in unison with the present buildings, both as to style—Renaissance—and to materials—terra-cotta and brick.

W. E.

BATTERSEA TOWN HALL: EAST SIDE.

We have already on previous occasions illustrated and described the new Battersea Town Hall, which was opened last week, as mentioned in another column.

The illustration here given, from a drawing exhibited in the Royal Academy of this year, shows what may be called, in an architectural sense, the back of the building; to which the architect, Mr. E. W. Mountford, has succeeded very well in giving a certain architectural interest by the bold treatment of the piers and buttresses and their corresponding piers; and though this front of the building was necessarily kept plain, it is architecturally certainly not the least interesting portion of the design.

SCULPTURE, BATTERSEA TOWN HALL.

The sculpture here illustrated, from photographs made from the sculptor's models, forms an important part of the decoration of the Battersea Town Hall. One of the subjects is introduced in the interior of the great hall, the others form the decoration of the centre and side pediments in the principal front of the building. The motive of the designs is sufficiently explained by the titles of the figures, given on the plate. The work was designed and modelled by Mr. Paul R. Montford, in conjunction with his father, Mr. H. Montford.

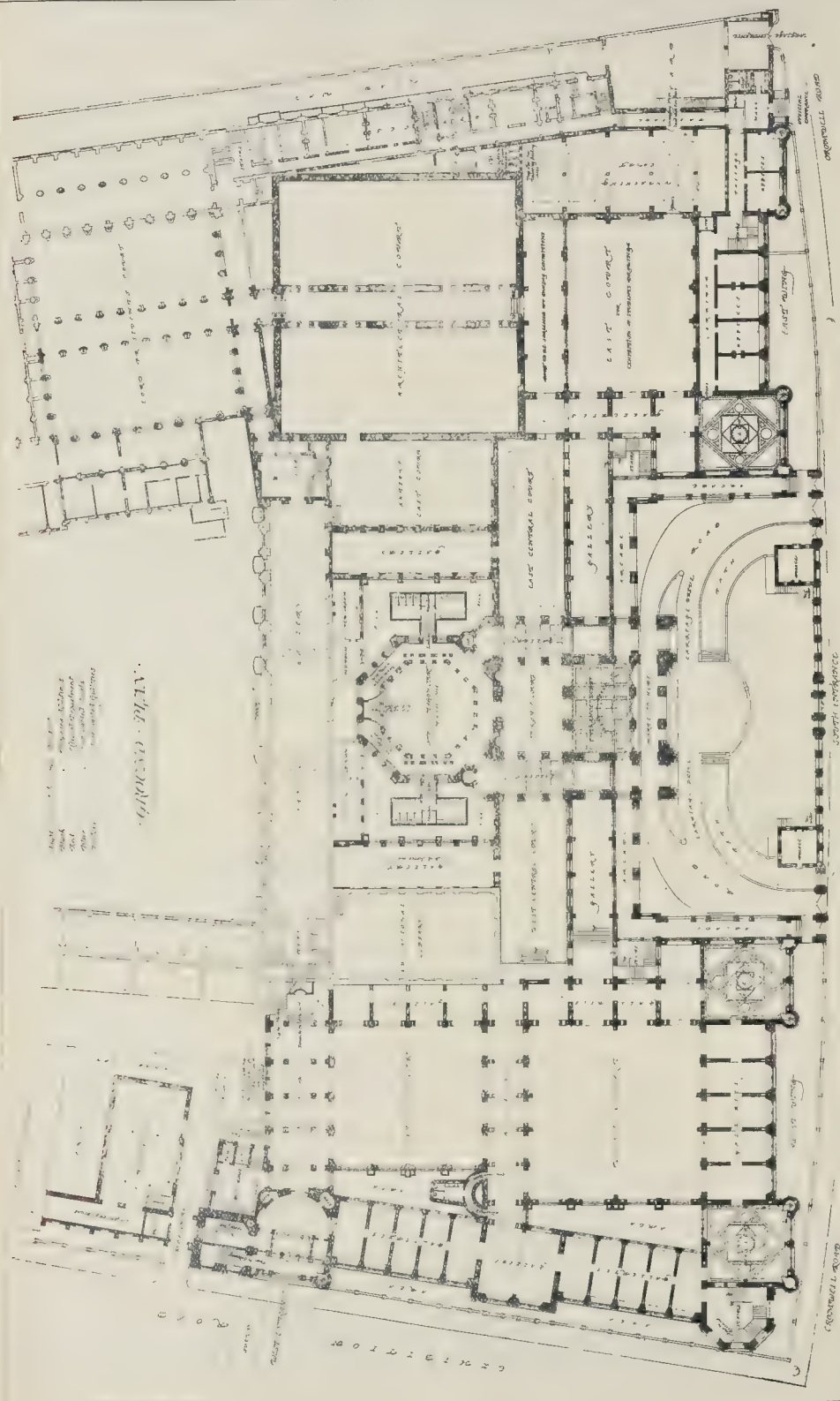
CHURCH, HOUSE AND SCHOOLS, BENHILL-ON-SEA.

The foundation stone of these buildings was laid on May 11, 1892, by Viscountess Cantelupe, and the first part of the scheme is complete and in full use, viz., the schools, class rooms, &c., with the small towers at the end of the picture. The trustees intend proceeding with the house next, and the church will follow as quickly as funds will admit.

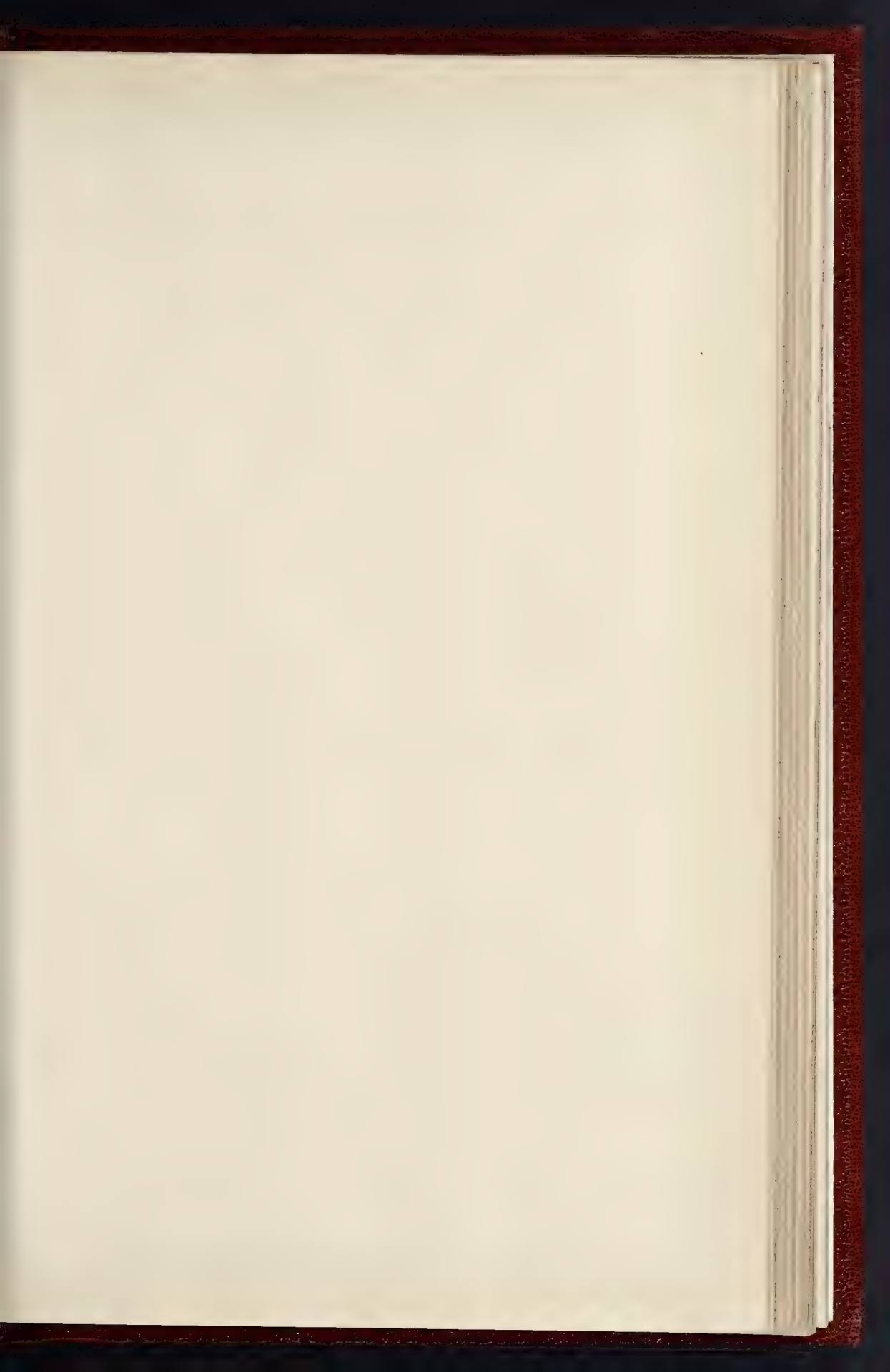
The architect is Mr. Philip Tree, F.R.I.B.A., of St. Leonards-on-Sea, and the drawing from which our illustration is taken was exhibited at the last Royal Academy Exhibition.

DESIGN FOR THE COUNTY COUNCIL HALL, STAFFORD.

This design was submitted in a recent competition, and the elevation illustrated is to a very narrow side street. The entrance to the offices, which are on the ground floor, was to be from this street, while the Council Chamber was approached from an entrance hall adjoining the Law Courts.



80 90 100 110 120 130 140 150 160 170 180 190 200





PANEL I.
H. 26 in. L. 18 in.



PANEL II.
H. 18 in. L. 26 in.

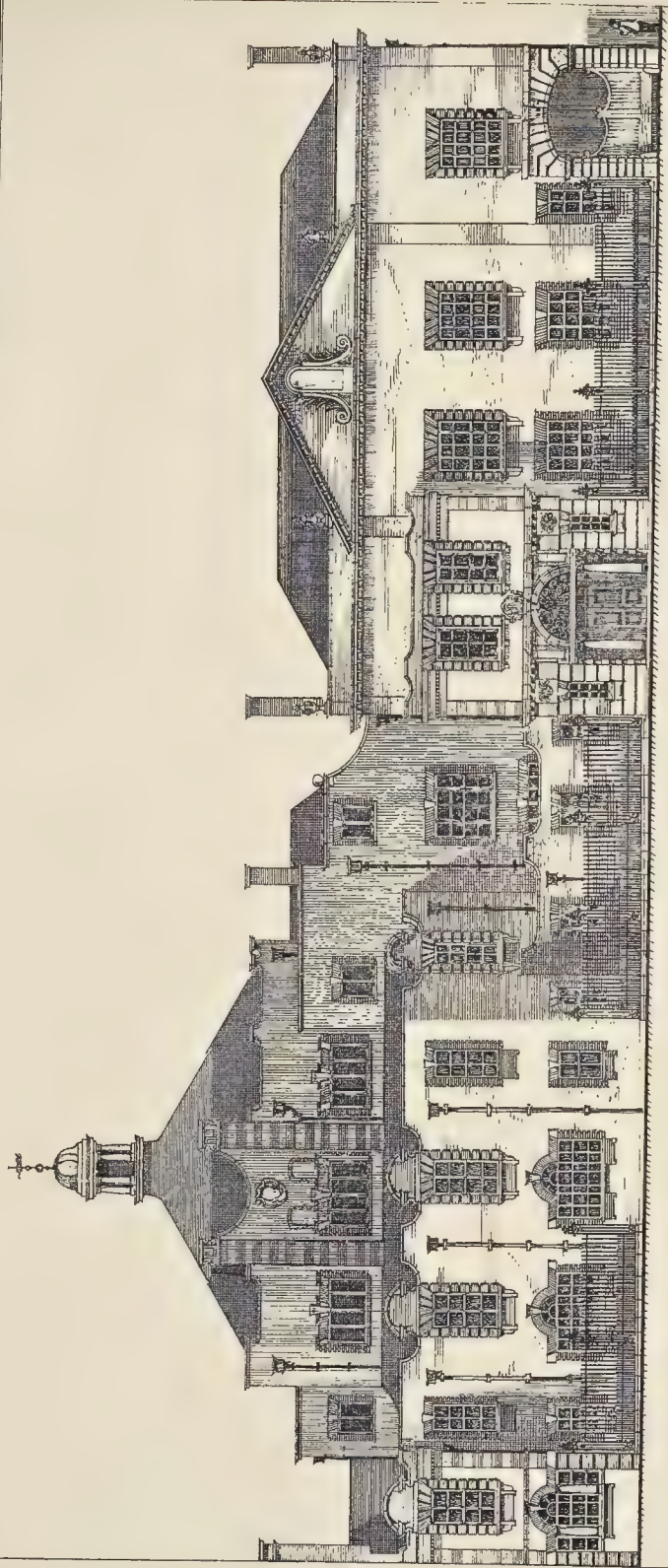
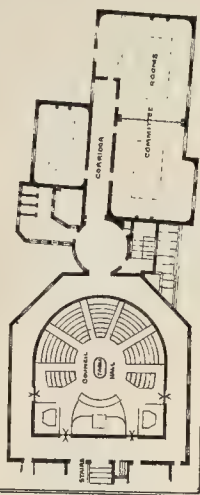


The Young B... ..

THE BUILDER, NOVEMBER 25, 1893.

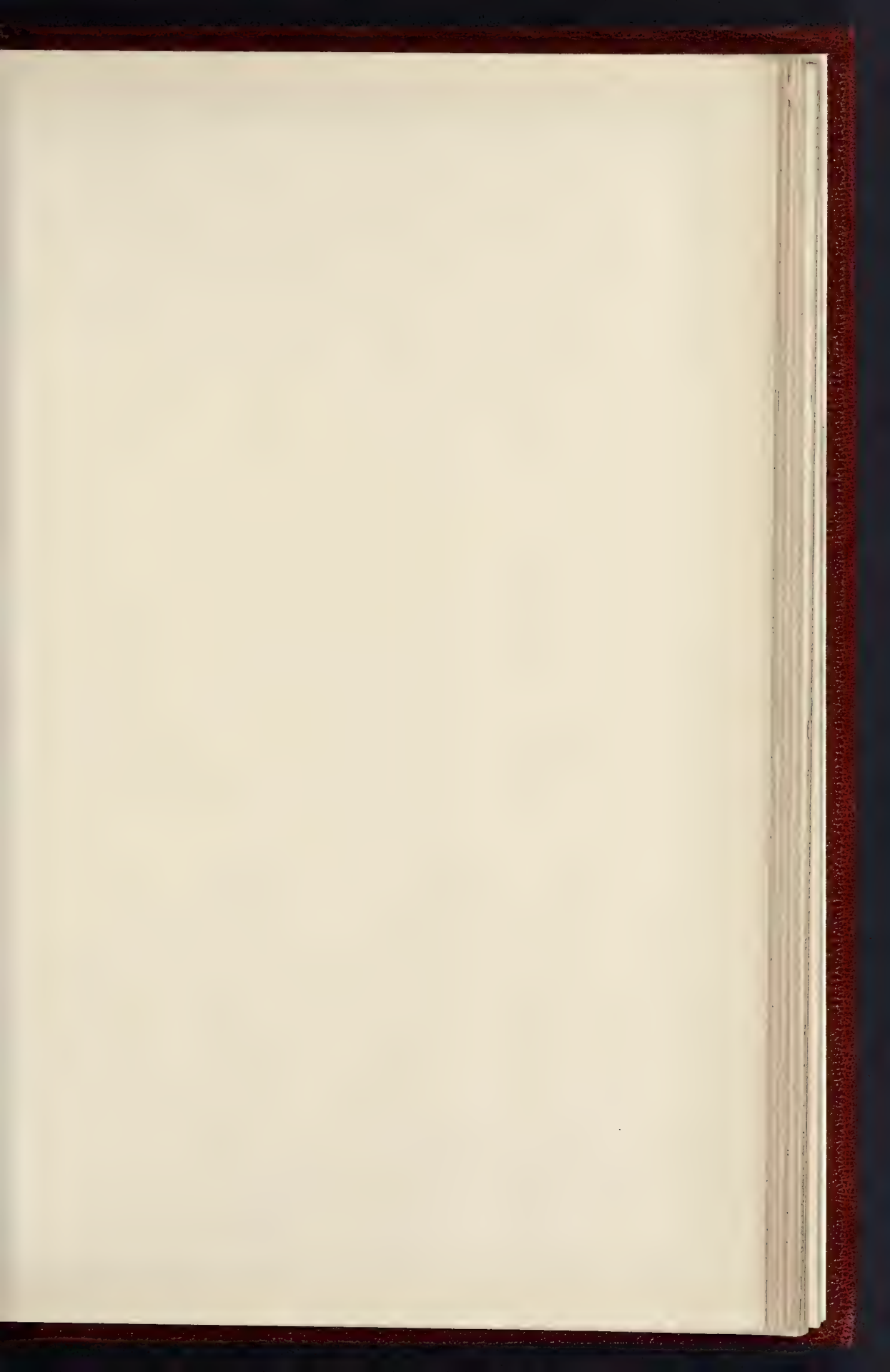


COMPETITION DESIGN
FOR
COUNTY COUNCIL OFFICES, STAFFORD.
BY MR W A PIERCE, F.R.I.B.A.



Royal Academy Exhibition, 1893

PHOTOGRAPH BY MR. J. H. L. EAST, HADFIELD STREET, N.E.C.





Royal Academy Exhibition, 1893

BATTERSEA TOWN HALL EAST



J. MOUNTFORD, F.R.I.B.A., ARCHITECT.

The Council Chamber was planned so that each member had a direct view of the chair. A lobby surrounded the chamber, and the committee rooms were adjoining.

The design is by Mr. W. A. Pite, and the drawing was exhibited in the Architectural Room at the last Royal Academy Exhibition.

Correspondence.

To the Editor of THE BUILDER.

RE TULLIE HOUSE, CARLISLE.

SIR,—In the *Times* of the 9th inst. is an account stating that the "plans and drawings" for the alterations and additions to Tullie House, Carlisle, and the converting of it into a "Free Library and School of Art," were prepared by the City Surveyor, Mr. W. Howard Smith, and this statement has been repeated in various other papers.

This is, I think, a mistake. These plans were prepared originally by Mr. Chas. J. Ferguson, F.S.A., the well-known architect, of Carlisle and London, to whom is due the credit for the conception of the scheme, the arrangements for access and egress, the sizes and proportions of all the rooms, the levels, &c.; in fact, the entire design.

In order that you may verify this statement, I enclose a copy of the *Carlisle Journal* of the 10th inst., which gives plans and sketches of the building as finished, and also a copy of Mr. Ferguson's plans which were published in your journal on May 9, 1891. These plans, which were not "sketches," as the *Carlisle Journal* states, but drawings to an $\frac{1}{4}$ -in. scale, Mr. Howard Smith had from the beginning, as well as certain details of stonework, and I think you will agree, on comparing the two, that the credit for the design should be given to Mr. Ferguson and not to him. In fact, with the exception of two or three minor points—the lighting of the art and lecture galleries, the altering of the positions of the master's room and lavatory, some slight rearrangement of the windows in the elevations—the work has been carried out exactly in accordance with the original plans.

The Castle-street entrance alone, you will observe, has been materially altered; but for this, I happen to know, Mr. Ferguson furnished the design as carried out, and this is acknowledged in the *Carlisle Journal* of the 10th inst.

I trust you will be able to find space for this in the *Times*, which, like the other dailies, rarely condescends to mention an architect's name in speaking of his work, does give a name, it should be careful to get the right one.

FRED. M. SIMPSON.

Westminster, Nov. 21, 1893.

LONDON AND FALKIRK FOUNDRIES COMPANY, LIMITED.

67, Upper Thames-street.

SIR,—The proposed flotation of a company under the above name has been brought to the notice of the undersigned, and as the name assumed appears to have already misled some of our clients, and may possibly leave a wrong impression on the minds of others who may but cursorily glance at the prospectus issued, and as we are known to many (more especially in Scotland) by the name of "The Falkirk Foundry," we shall esteem it a favour if you will be good enough to insert this letter disclaiming any connexion whatever with the proposed company.

For the Falkirk Iron Company,

T. W. ALSOP,

General Manager.

PARISH CHURCH, BRELHAN, CARMARTHENSHIRE.

The new parish church of Brelhan was on Tuesday consecrated by the Bishop of St. David's. The new church has, besides a nave and chancel, porch on the north side and a vestry on the south, a west end of the nave having a triple-arched bell tower. The church is built of native stone, with light freestone windows and other dressings, and is covered with grey slates. The nave roof inside is open-timbered, and the roof of the chancel is wagon-boarded, and its east window is filled with Muranese stained glass by Swaine Bourne, of Birmingham. The altar standards and other wrought-iron work on doors, &c., are by Brown & Co., also of Birmingham. The carving is by Herridge, of Cardiff. The chancel pavement and nave gangways are laid with Maw's encaustic tiles, and the building is warmed with one of Porritt's hot-air underground ovens. The contractors were Morris & Co., and Mr. E. H. Lingen Barker was the architect.

The Student's Column.

GEOLOGY.—XXII.

FOUNDATIONS.

GIVEN plenty of scope over a good range of country, or over a large estate, it is not difficult to select a building site which shall be perfect, both from the point of view of health and suitability for foundations. But these essential qualifications are frequently denied to the architect. His buildings are, in too many cases, designed with reference to an already selected site; if in a town, for a good business thoroughfare or suburban avenue; if for the country, on some spot sacred to the client, or where a good view may be obtained. A knowledge of the properties of strata, so far as foundations are concerned, however, is even then useful, for if the site is a bad one, he will know how to treat the foundation or the structure accordingly.

We find many misconceptions prevalent as to what should or should not constitute a good, stable foundation. Clay is universally regarded as a bad one; and although this, in most cases, is unquestionably true, under certain circumstances it becomes a fairly good site. To illustrate this point let us pause for a moment to consider the structure of clay. Under the microscope, it is seen to be composed of myriads of exceedingly minute particles of matter, mainly silicate of alumina, plus a little foreign material. On being saturated with water it becomes plastic, and the student is particularly desired to note that the plasticity of clay is entirely due to the abundance of water in it. A simple experiment suffices to prove this. Take a lump of plastic clay and place it before a fire until it becomes hard or baked. During the process observe that a great quantity of moisture is driven off, and that as the moisture disappears the clay gets relatively harder and loses its plasticity.

Now, the value of clay-soil as a foundation is chiefly governed by the amount of water it holds. Clay is practically non-porous, but it is a great mistake to imagine that it is also non-absorbent. The fact is, it is capable of absorbing enormous quantities of water, but does not freely transmit the fluid through its mass. It may be taken as a general rule, where the clay is tolerably dry and hard, that unless an unusually heavy structure is to be erected thereon it will do well enough. On the other hand, if the clay is plastic or wet, special treatment is required.

Practically, the same observations apply to alluvial muds and the like, only they are nearly always partially water-logged. It is profitable in this place to allude to the alteration in character produced in many soils, as foundations, by the periodical influx of water. Such influx may or may not be perceptible at the surface. Where the site is on an alluvial flat, periodical rains frequently cause alterations in the water-level in the soil; so that the abstraction of water at one period of the year causes a certain amount of shrinkage, when settlements are liable to take place, whilst the accession of water at another causes the clay or alluvium to swell out, when basement floor-boards are raised and walls are cracked. *Apropos* of this subject, we know that the drought during the past summer materially affected the stability of many houses in and around the metropolis—mostly, however, of the "jerry builder" type. The drought having deprived the soil of its usual amount of moisture, shrinkage ensued, and whole rows of "eligible suburban residences" came to grief. The soil in these cases was not formed as an alluvial flat; the damage was caused mostly on thin gravel beds, or clay.

Then, again, we have abundant evidence that where the natural drainage is interfered with by the construction of sewers, or otherwise, the result on houses previously erected near the spot is often disastrous. On the other hand, the bursting of a water-pipe in gravelly soil may be attended with much danger, especially if the leakage be not speedily stopped.

When the ground consists of solid rock, gravel, hard marl, or fine sand, *ceteris paribus* it generally makes a good foundation; but special reservations must be made in all cases where there is a considerable dip in the strata and the site is on sloping ground. At the edge of steep descents with dipping strata, it is necessary to find layers that will not slip, or if such a tendency exists, to strengthen them by a wall, especially when the rock is liable to undergo much decomposition by exposure to the air. We frequently find rocky formations composed of a number of thin layers of limestone separated from each other by thin partings of clay. The latter may be a few inches in thickness, when they are clearly

perceptible; but, on the other hand, they may be, and often are, so thin that in spite of their interposition the beds of limestone appear to rest on each other. In such cases the ground is treacherous, even whilst it looks very firm. The thin clay parting gets wet during heavy rains, and acts as a species of lubricant when the heavy slabs of limestone are induced to give way, after the building has been erected.

The same remarks do not apply to thick, slightly inclined beds of limestone or sandstone which rest on each other, and are more or less compact; these, as a rule, form good foundations. The only points to be attended to are that the bedding and vertical joints shall not be too wide, that the strata are not overhanging, nor too much inclined.

To return to foundations in softer strata, we would call attention to the fact that most soils called clays are in reality clay mixed with a certain percentage of sand. The grains of the latter are so very minute, and so closely incorporated with the particles of clay that to the inexperienced they would probably pass as part of the clay; even a geologist would hesitate before calling the material loam (sandy clay), which in his nomenclature generally refers to a somewhat coarser species of the same material. We know of very few kinds of ground that make such bad foundations as this very fine sandy clay. Almost everywhere it seems to be thoroughly saturated with water, the more open character produced by the sandy particles causing it to become very absorbent, and at the same time retentive. This is the kind of soil that moves laterally as the building is in course of erection.

Loam, properly so-called, does not usually make an excellent foundation; it is porous without being firm. We have this consolation, however—it makes good bricks, so that where the bed is only a few feet in thickness, which is often the case, it is worked off for economical reasons before the building is erected.

Ground having only a superficial hard stratum resting upon a soft subsoil is sometimes very difficult to deal with. The best thing to do in such cases, no doubt, is merely to increase the bearing surface of the building and to lighten the superstructure as much as possible, but this necessarily interferes considerably with the design. It is, of course, advisable to place the foundations below all soft soil where the latter can be easily bottomed.

Quicksands are very troublesome in excavating, as everyone knows. Sometimes large buildings have been securely built on quicksands of too great thickness to be excavated, by the aid of excellent hydraulic mortar, and by excavating separately the bed of each bottom stone. Such a building will be stable if its pressure on the foundation is uniform throughout, and if it is placed sufficiently deep to counterbalance the tendency of the sand to flow back into the foundations. Instances of this class of foundations are to be found in sewers built on water-bearing sands, which sometimes give rise to as much difficulty as those built in rivers.

The foundations of buildings in countries subject to violent earthquakes have, of late years, received much attention, especially in Japan. Experiments have shown that earthquake motion may be partially avoided, either by making a seismic survey of the area on which it is intended to build, and then selecting a site where the motion is comparatively small; or by adopting free foundations, or using deep ones. Relatively high and hard ground is, as a rule, much more suitable as a site for building than soft ground. Professor Milne recommends that ordinary inexpensive dwelling-houses should rise from a solid wall which itself has a foundation deep enough to reach hard ground. If the ground is soft, and therefore liable to considerable motion, the house might rest upon layers of cast-iron shot not larger than buck-shot. With regard to safety dependent on excavations, or the contour of the ground, it must be remembered that if a building is only partially surrounded by openings like ditches, moats, steep valleys, and the like, it may be in greater danger than if such excavations did not exist. The upper edges of cliffs and scarps, where the motion of the free face of the cliff or scarp is naturally great, are also dangerous situations, more especially when the strata dip outwardly. Very wet ground, or ground which is marshy, notably forms a bad foundation in earthquake countries, apart from other matters.

We need only say a few words as to the foundations of reservoirs. The first consideration is that

¹ Cf. J. Gaudard. "Min. Proc. Inst. C.E.," Vol. I. (1877), p. 713.
² "Min. Proc. Inst. C.E.," Vol. LXXXIII. (1886), p. 289.

the ground out of which they are to be excavated or whereon they are to be formed, shall be watertight. Then comes the question whether the strata, if watertight, are thick and homogeneous enough to sustain the enormous weight to be put upon them. Especial attention should be directed to the amount of inclination, if any, of the beds concerned. If in solid rock, the existence of prevalent joints should be noted, whilst the actual degree of porosity of every variety of such rock should form the subject of direct investigation.

OBITUARY.

DR. DOHME.—We regret to announce the untimely death of the Prussian Privy Councillor, Dr. Dohme, who, at the instance of the late Emperor Frederick, held office as Official Art Connoisseur to the royal household. Dr. Dohme was the honorary secretary to the Royal Academy of Arts as well as honorary associate of the "Akademie fuer Bauwesen." He had for some years been a curator of the National Gallery and for a time custodian of the court libraries. He was originally educated as an architect and studied for several years in Italy, France, the Netherlands, and England. Of his many valuable literary productions one of the most important is his "History of Architecture," a new edition he but lately revised together with Professor F. Adler. Of other volumes we would mention his description of English homes, his history of the Berlin Palace, and a history of German architecture. He died in his forty-eighth year.

M. HIPPOLYTE DESTAILLEUR.—The death of this eminent French architect, which took place at Paris on Thursday the 16th, is briefly recorded in our "Foreign" column of this week. M. Destailleur was born at Paris in 1822, the son of François-Hippolyte Destailleur, a Government architect and well known as a learned collector of works of art, and who had a large and influential *collection*. The son was educated as an architect under Achille Leclerc, and from 1848 to 1852 carried on the practice of his father, both in regard to official and private work. Besides the work which he carried out for the State, at the Ministère de Justice, the Imprimerie Nationale, and the Hôtel des Monnaies, he was the architect for numerous private houses mostly based on the styles of the two previous centuries. In Paris he built the Hôtel d'Haussonville, Lutteroth, Bégué, Mouchy, Noailles, and the Maison Mère du Sacre Cœur; in the provinces, the château and church of Mouchy, the châteaux of Devonne, Courance, and Mello; in other countries, the Hôtel de Baron Albert de Rothschild at Vienna, the mansion of Baron Ferdinand Rothschild in England. He also carried out the restoration of the Hôtel de Pourtales at Paris, of the château of Vaux-Praslin (Seine-et-Marne), and the residence of Prince Pless, in Silesia. A considerable part of his attention was also given to increasing the valuable collection of works of art left by his father, the total value of which has been estimated at 50,000*l.*, and the catalogues of which are precious contributions to the history of art from the fifteenth to the nineteenth century. In relation to this collection, he published the "Recueil" of engravings illustrating the decoration of apartments from the sixteenth to the eighteenth century (Paris, 2 vols. folio, 1863), and "Les plus excellents Bastiment," of Du Cerceau, engraved in facsimile by M. Faure Dujaire (Paris, 1870). Destailleur was a chevalier of the Légion d'Honneur and Lauréat of the Société Centrale des Architectes. At his funeral at the Cimetière Montparnasse on the 18th, M. Daumet, as representative of the Société Centrale, paid the last honours to Destailleur in an eloquent speech over his grave.

GENERAL BUILDING NEWS.

METHODIST CHURCH, BALMORAL, DUBLIN.—On the 4th inst., the memorial-stones in connexion with the new Methodist Church, Balmoral, were laid. The ground on which the edifice is being erected is situated near the Lisburn-road end of Osborne Park, on which it has a frontage of 100 ft. The internal dimensions of the church are 68 ft. long and 35 ft. wide, in which provision has been made for seating 420 adults. The elevations of the building are in Late Gothic style, built of red bricks, with dressings of red sandstone. The front elevation contains the entrance doorway, over which is a four-light window. The buttresses in the front are terminated by pinnacles of wrought stone. The body of the church will have two aisles, with pews in the centre, and also in the sides. Accommodation for the choir will be provided on a raised platform adjacent to the pulpit, behind which is situated the chamber for the organ. The roof timbers, which are exposed to view, will be of pitch-pine. The windows will be glazed in cathedral leaded lights. The church is being erected by Mr. James Kidd, from the plans and under the superintendence of Mr. J. J. Phillips, of Belfast.

ENLARGEMENT OF CATHOLIC CHURCH, HORSE FAIR.—Various improvements have recently been carried out at St. Catherine's (R.C.) Church, Horse Fair. The work of enlargement was

entrusted to Messrs. Cossins & Peacock, of Birmingham, and the contractors were Messrs. Barnsley & Son. The blank wall which closed the triple arch at the east end has given place to a chancel with seven open arches and freestone columns, looking out upon an ambulatory. These arches are acutely pointed and form an arcade with pillars and carved capitals. The arcade is continued above by a clerestory with a row of mullioned windows, filled with leaded lights of cathedral glass. The roof is arched with wood, in the groined panels divided by moulded ribs. This and the spandrels and other wall interstices of the apse are left blank and prepared for decorative painting at some future time. At the extreme end of the south aisle is a Lady Chapel with semicircular vaulted roof and an arcade apse for the altar. There are also recesses in the ambulatory, which may be extended later for additional altars. Two sacristies have been added, for priests and acolytes respectively, and the plans include a vicarage yet to be erected. The high altar, which rests on an elevated platform, is of Caen stone, with arcaded and carved panels. These, together with the wall-spaces already mentioned, Mr. W. J. Winnwright, who has designed the altar itself, is to fill in with painted figures and other subjects.

POWIS MEMORIAL CHURCH HOUSE AT WELSHPOOL.—The Church House which has been erected at Welshpool as a memorial to the late Earl of Powis was opened recently by the Countess of Powis. The building comprises a hall capable of seating over 300 people, with a stage at the end so contrived as to be completely separated from the hall, when it forms a smaller room. Beneath the stage is a kitchen. It is approached by an entrance from Church Bank, separate from the main entrance, and having an easy means of communication with the hall. It is intended to be used also as a cloak room when necessary. The hall is approached from Church Bank by a double flight of steps leading to its two entrances. It is about 60 ft. long by 26 ft. wide, and has an arched roof of unstained pitch-pine celled in the interspaces. The windows are glazed with lead quarries. The two large windows at the western end are partly fitted with the armarial peacocks of the Powis family. The building is constructed of the local hard green rubble stone, with dressings of red Grinshill and purple Alveley free stone; while the roofs are covered with Green Nantlle slates. The work has been carried out by Mr. Roberts and Mr. C. T. Pugh, of Welshpool, from designs by Mr. T. E. Pryce, London; the stained glass work has been executed by Mr. Jennings, of Clapham; and the wrought ironwork by Mr. Ellesley, of London.

BLACKPOOL TOWER BUILDINGS.—The contract for movable circular floor in the arena of the circus in connexion with the Blackpool Tower buildings, has been let to Messrs. Payne, Galwey & Co., engineers, of Ulverston, their estimate being 788*l.* The architects for the work are Messrs. Maxwell & Tuke, of Manchester.

SCHOOL BUILDINGS, STOCKPORT.—On the 11th inst. the memorial stone was laid of St. Peter's New School, Stockport. The building will have a frontage to the square and a side elevation to St. Peter's gate. Three pedimental gables are shown on the front elevation, and are surmounted with moulded finials. The side elevation facing the Post-office will have two gables similarly treated, having large semi-circular windows in each. Provision is made for four class-rooms averaging in size about 320 square feet to each room. They are lighted by square-headed windows. The accommodation comprises a schoolroom, teachers' retiring-room, lavatories, cloak-rooms, &c. The kitchen is to be fitted with a range and working bench. The walls of all class-rooms and large schoolroom are to be faced four feet high with glazed bricks. The internal joinery work will be executed in selected yellow pine. The ventilation has, we understand, been carefully considered. Messrs. Peace & Norquoy's folding partitions will be used to divide every classroom throughout from the schoolroom. The fourth class-room is raised three feet above the general ground floor level, and will form a proscenium for concert and dramatic performances. The space thus obtained will seat about 500 persons. Externally the building will be faced to the height of the windowsills with a local red stock brick finishing. Above this the building will be treated with chequer bricks. The roof will also be tiled. Fixed about halfway up the small gable to the cloak-room, there will be a terra-cotta niche, with a canopy, enclosing a modelled figure of the patron saint—St. Peter. The figure has been modelled in the Ruabon clay. The roof will be composed of a Velinelli Welsh blue slate, furnished with a red ridge. The contract for the whole of the work has been entrusted to Messrs. T. & W. Mead, of Heston Norris, Mr. Thomas Reid doing the plastering, and Messrs. Hammett & Son the painting. The architects, from whose designs and under whose superintendence the work is being carried out, are Messrs. Woodhouse & Willoughby, of Manchester and Stockport. The design was selected by the managers, aided by a professional referee, in a limited competition.

MUNICIPAL BUILDINGS, BAILEY, &c.—On the 15th inst. Lord Rosebery opened the new Municipal Buildings and Town Hall, which have been erected on the Elm House Estate, Llandover Hill, Battersea.

As many of our readers know, Mr. E. W. Mountford is the architect, and Mr. W. Wallis the builder. The skylights over the main staircase were glazed on Messrs. W. E. Rendle & Co.'s patent "Invincible" system. We described and illustrated the buildings in our issues for December 19, 1891, and July 9, 1892. Other illustrations of the building will be found in the present issue.

TULLIE HOUSE, CARLISLE.—The Institute of Literature, Science, and Art, established by the Corporation of Carlisle at Tullie House, was opened by the Mayor recently. The two buildings, the old and the new, comprehended under the name of Tullie House, have been arranged in eight departments upon basement, ground, and first floors, to which access is obtained by the main entrance from Castle Street, by a central entrance reached from Castle-street, and by the old entrance hall of the old buildings which may be entered from Abbey-street. The outside walls of the new building are of red sandstone. The Public Free Library is located in the portion of the new building contiguous to Castle-street, and is sub-divided into the following rooms:—The general reading room and lending library, the reference reading room, the patents, reference, and Jackson libraries, and the boys' reading room. The whole of the Public Free Library is on the ground floor, with the exception of the boys' reading room, which is in the basement and is reached by a staircase from the front entrance, and the Jackson Library, which is on the mezzanine floor. The whole of the old house is devoted to the Museum, with its old entrance-hall and other rooms on the ground and first floors, and a long room forming a portion of the ground-floor of the new building extending from the central entrance-hall to Abbey-street. The picture exhibition galleries, which form the third department, are in two large rooms on the first floor, immediately above the general reading-room and reference reading-room, and are reached from the main staircase. The School of Art is entirely on the first floor, and comprises elementary, advanced, painting, and antique rooms, with art-master's room and lavatories. The fifth department of Tullie House is intended for science schools, and consists of modelling, carving, and other rooms on the ground-floor of the new buildings near to Abbey-street. The lecture theatre, with small lecturer's room adjoining, is the sixth department, and is situated on the ground-floor between the reference reading-room and the science schools. Adjoining the lecturer's room on the ground floor is a small room which may be utilised for holding meetings. The lighting and heating stores include the dynamo and engine-room, boiler house, and store-rooms, situated in the basement and connected by subways from one end of the building to the other. The scheme for the introduction of the electric light into the building was devised by Mr. Howard-Smith, the City Surveyor, who has supervised the execution of the new building. The chief contracts were taken by Messrs. J. & W. Baty for bricklayers' and masons' work; Mr. H. Court, carpentry and joinery; and Messrs. R. M. Ormerod & Son, fire-proof flooring. Mr. Howell was clerk of works. We published in the *Builder* of May 9, 1891, some drawings of Tullie House as proposed to be adapted for a free library and school of art, which were furnished to us by Mr. C. J. Ferguson, of Carlisle.

CHURCH, DONALDSON'S LODGE, NORTH MBERLAND.—A Primitive Methodist Church has just been built at Donaldson's Lodge, Northumberland. The architect for the new building was Mr. George Reavell, Alnwick, and the other works were undertaken by the following:—Mr. Elliott, Berwick, builder; Mr. Jeffrey, Twizel, joiner; and Mr. G. Smith, Tweedmouth, plumber.

NEW CHURCH, FOREST GATE.—The first portion of a new church was consecrated to St. Mark at Forest Gate on the 20th inst. It consists of a few bays of the nave and of the side aisles, accommodation being provided for about 250 persons, but with open spaces for chairs for about 70 or 80 more. The building is erected of brick, with the external angles and arches of red brick. The walls internally are plastered. The west front has two tracery windows, the others, to the portion erected, are single lancets. The east end is at present fitted with a temporary framing of iron and corrugated iron, capable of being shifted in position when funds may admit of an extension of the fabric. The works have been carried out by Messrs. Allen & Sons, builders, of Kilburn, from the plans of Mr. E. P. Loftus Brock, F.S.A., in the completed short space of about five months. The church will consist of a nave and side aisles, a chancel, with vestries right and left, and entrances on each side, the site touching houses right and left of the church. A lofty bell-turret of timber is to be erected over the chancel arch. It is hoped that the second portion of the works will be commenced in a year or two.

BAPTIST CHAPEL, ABERDEEN.—The foundation-stone of a new Baptist Chapel was laid at Gilcomston Park, Aberdeen, on the 15th inst. Messrs. Brown & Watt are the architects, and the cost of the church is about 3,000*l.*

CHURCH HALL, FAIRFIELD, LANCASHIRE.—On Tuesday the Bishop of the diocese opened a new hall in Lockerby road, Fairfield in connexion with

the church of St. John the Divine. The building consists of a hall 93 ft. long, inclusive of a gallery at the west end, and 35 ft. wide, the total seating accommodation being for over 500. The hall is approached through an outer and inner vestibule, the sides of which are situated the cloak-rooms, lavatories, &c. Behind the platform is a class-room and also a house for the caretaker. The chief contractors are Messrs. Raffie & Campbell, the sub-contractors being:—For brickwork, Messrs. Wearing & Sons; slating and plastering, Messrs. John Tanner & Son; plumbing, Mr. John Powell; heating, Messrs. J. Cooper & Sons, and ornamental plaster work, Messrs. Goodall & Sons. The architect was Mr. Charles E. Descon.

THE BIRMINGHAM AND MIDLAND EYE HOSPITAL.—About eleven years ago the Governors of this Institution, finding insufficient accommodation in their old premises in Temple-row, commenced the erection of this present building at the corner of Church-street and Edmund-street. The demand upon the resources of the Institution has so much increased, that last year the Governors decided to take steps to increase the accommodation. The Committee decided to extend the building on to the adjoining vacant piece of land upon the street frontage, and that a separate Department for the school should be arranged, accommodation for nurses and servants, and the lavatories of the Men's and Women's Departments rearranged so as to make them more isolated than at present. The Committee obtained two sets of plans from different local architects and last week decided to adopt those prepared by Mr. Henry F. Talbot, who is the architect of the late building of the firm of Payne & Talbot. The accommodation to be provided will include wards for thirty children's beds, day room, ward kitchen, lavatories, &c., for the children's department, and additional dormitories for ten nurses and six servants for the hospital laundry.

ADDITIONS, ST. EDMUND'S CHURCH, EXETER.—Some artistic additions have just been made to the altar of this church. The altar table is composed of portions of the pulpit once used in the edifice. It has now been considerably lengthened. At either end niches have been placed, having arched canopies, and within these are sculptured angels in attitudes of adoration. An oak tabernacle has also been placed upon the altar, this being also adorned with carving, the central panel being a representation of the chalice and paten. The works have been carried out by Messrs. Harry Hems & Sons, of Exeter.

SANITARY AND ENGINEERING NEWS.

SANITARY ARRANGEMENTS, LEICESTER.—This town appears still to be in difficulty with its sanitary arrangements; and from a recent report in the *Leicester Daily Express* it appears that while arrangements were made by the late Surveyor (Mr. Gordon) to send away storm water by a sewage through the storm overflows into the Soar on occasions of very exceptional rain, such as might accompany an occasional violent thunderstorm, there is nothing to prevent the sewage being diverted into the river in this way at any time when the Corporation authorities find it convenient to do so. It is asserted that they make use of this opportunity, and that no other supposition can account for the pollution which is found in the river from time to time.

SEWERAGE SCHEME FOR BRADFORD.—A meeting of the Street and Drainage Committee of the Bradford Corporation was held on Tuesday to hear a report from the Borough Surveyor (Mr. Cox) on the proposed sewerage works at Fryinghill, and a report from a deputation which has visited various places. The scheme will involve the expenditure of about 200,000l.

PROPOSED RE-BUILDING OF GLASGOW BRIDGE.—At a special meeting of the Glasgow Police Commissioners, on the 13th inst., it was agreed to apply to Parliament for power to rebuild Glasgow Bridge. It is proposed that the present bridge should be taken down and reconstructed upon cylindrical foundations, the width of the bridge being increased 80 ft. within the parapets. The engineer has expressed the opinion that the bridge can be erected, according to the plans of Mr. Mason, for 80,000l., and that the proposed alterations would entail an additional cost of about 5,000l. The proposal of the Committee was, after some further discussion, agreed to.

SEWERAGE WORKS, WORTHING.—According to the *Standard*, Mr. Mansergh's plans for the assimilation of the sewage systems of Worthing and West Worthing were considered and approved at a special meeting of the Worthing Town Council on Tuesday. The scheme devised by him is to have the main sewers all form a junction with the existing sewers, and convert the West Worthing sewage to the eastern outlet, replacing the present defective sewers in outgut-street, and near the old Waterworks. Provision is made for ventilating the sewers by means of a chimney. The scheme for dealing with the sewage at the outfall is briefly this: steam pumping plant will be erected near the high end of the present 4 ft. barrel sewer, to lift the sewage and run it into open tanks capable of holding one million

gallons. A head-wall will be built in the present sewer at the pump-well to cut off the sewers from the outfall. A new 27-in. outfall sewer from the tanks will be laid out to sea, so that its mouth will always be below water. As the tides at Worthing flow eastwards four hours and westwards eight hours, the sewage will all be discharged in the four hours, the dry-weather working will be as follows:—The pumps will lift the sewage as it comes day and night into the tanks, so that, in fact, the sewers will act as if there was a free outlet at all times, and backing up will be done away with. During the eight hours' westward flow the sewage will be stored in the tanks, and will be let out during the four hours' eastward flow, together with the sewage pumped during the four hours, and the tanks will all be empty when the outlet has to be closed.

WATER SUPPLY OF WATERBECK, DUMFRIES-SHIRE.—The introduction of a new water supply for Waterbeck, Dumfriesshire, has just been completed. The supply is from two springs. From the springs the water is conveyed to a tank, hundred yards from the house, which is formed of concrete, and is 20 ft. long by 9 ft. wide, and is capable of containing about 5,000 gallons. Provision has been made along the track for scouring the pipes, and at the highest point there is an automatic air-valve. The scheme has been carried out by Mr. Carlyle, Waterbeck.

THE WATER SUPPLY IN CONSEQUENCE OF CERTAIN ALLEGATIONS THAT THE WATER SUPPLIED TO PAISLEY WAS IMPURE, AND HAD A CLOSE RELATION TO THE EPIDEMIC OF ENTERIC FEVER WHICH HAS BEEN PREVALENT IN THE TOWN FOR SO LONG, THE PAISLEY WATER COMMISSIONERS DIRECTED MESSRS. LESLIE & REID, C.E., OF EDINBURGH, TO INVESTIGATE THE CONDITION OF THE WATER SUPPLY, AND PROFESSOR FRANKLIN, D.D., THE BACTERIOLOGIST, WAS ASKED TO ANALYSE THE WATER. THE ENGINEERS HOLD THAT THE WATER IS RUSHED TOO QUICKLY THROUGH THE FILTERS, HENCE THE LARGE AMOUNT OF VEGETABLE MATTER FOUND IN IT; AND PROFESSOR FRANKLIN MENTIONS A CASE IN POINT IN CONNECTION WITH THE THAMES WATER COMPANY, WHERE WATER MORE CONTAMINATED THAN THAT OF THE PAISLEY, BECAUSE IT IS ALLOWED SUFFICIENT TIME TO PASS THROUGH THE FILTERS COMES OUT PURER. HE FOUND IN THE PAISLEY SUPPLY A CERTAIN QUANTITY OF VEGETABLE MATTER AND BACTERIA OF A GENERAL CHARACTER, MOST OF WHICH COULD BE REMOVED BY BETTER FILTRATION, BUT THE ENTERIC BACILLUS WAS ENTIRELY ABSENT. NEW FILTER BEDS, A SETTLING TANK, RENOVATION OF THE PRESENT BEDS, AND OTHER IMPROVEMENTS ARE SUGGESTED AT A PROBABLE COST OF 15,000l. OR 20,000l.

TELEPHONIC COMMUNICATION FOR THE LIVERPOOL CORPORATION.—Telephonic communication has lately been established for the Corporation of Liverpool, connecting the offices of the water engineer in Liverpool, with the water supplies of Lake Vyrnwy (North Lancashire) and the River Mersey (North Lancashire), and the houses of the reservoir keepers and walkmen along the lines of aqueducts. The work has been carried out to the specification of the city Water Engineer (Mr. J. Parry, M.Inst.C.E.), by Messrs. W. A. Shaw & Co., of Stockport. The system is entirely on the metallic circuit principle, and the wires are carried as nearly as possible along the lines of aqueducts.

DRAINAGE OF ST. MARY, NEWINGTON.—The vestry of St. Mary, Newington, has commenced a thorough investigation of the whole of the drainage system of the parish, which is 632 acres in extent, and contains about fifty miles of sewers. Mr. Alfred Mark, who has been engaged for the past eighteen months upon a revision of the parish survey and the preparation of new plans for this purpose, has been retained by the vestry to carry on the work in conjunction with Mr. J. Paget Waddington, A.M.Inst.C.E., Surveyor to the vestry. When completed the plans will afford a correct, up-to-date record of the position, levels, depths, &c., of all the existing sewers in the parish.

RESTORATION OF BEAULY BRIDGE, INVERNESS.—At a meeting of the Aird District Committee of the Inverness County Council recently, plans were submitted for the restoration of the bridge across the river at Beauly. With the view of restoring the fallen portion, and making the bridge complete, Sir John Fowler proposed that foundations of the piers should consist of three cast-iron cylinders, upon which the mason work should be constructed. In answer to a question, Mr. Manners, C.E., said the estimated cost was about 5,000l. Contracts for the work, which is to be completed within six months of acceptance, are to be invited. It was stated that Mr. Paterson, C.E., the architect, had awarded 1,428l. 14s. 3d. to Mr. Thomas Macdonald, builder, as the sum payable for the work done by him in the effort to restore the bridge.

FOREIGN AND COLONIAL.

FRANCE.—The committee which has been formed to raise a monument to Gounod has not yet chosen a sculptor, but it has decided that the monument shall be erected in the Parc Monceau, if the Municipal Council authorise this. In that case the pedestal will be designed by M. Formigé, the architect. —M. Jean Paul Laurens is at work on an immense canvas intended for the Salle des Illustres in the capital at Toulouse. The subject is an episode of the second siege sustained by Toulouse against Simon de Montfort, in the war of the Albigeois.

The work will probably occupy the painter for two years longer. —A committee has been formed at Frejus to raise a monument to the Abbé Sieyès. —The Princess of Chauveau Narishkine has left to the Department of Finistère her château de Keryolest—an architectural curiosity. It was built in the time of Charles VIII. and Louis XIII., and contains sumptuous furnishings and tapestries, as well as some rare and curious specimens of old falconry. The gift is said to have been made with the view of promoting the artistic education of the inhabitants of Finistère. —At Bordeaux, on the Place des Quinconces, a monument is to be erected to the memory of the Girondins killed during the First Revolution. M. Dumilâtre (sculptor) and M. Rich (architect) are to carry out the work in conjunction. It will consist of a large fountain surmounted by a terrace on which will be a triumphal column nearly 50 metres high, the pedestal of which will have bas-reliefs representing the principal events in the history of the Deputies of la Gironde at the National Convention. The cost of the monument is estimated at 570,000 francs. —The Commission Supérieure des Bâtiments Civils has under consideration a report by M. Paul Deschamps on the completion of the Bibliothèque Nationale between Rue Colbert and Rue Vivienne and the Jardin de la Bibliothèque. The cost is estimated at 7,000,000 francs, and the work would occupy five or six years. —The death is announced, at the age of 71, of Hippolyte Deschamps, member to the Government, and who was commissioned by the Empress Eugénie, in 1879, to design the chapel at Farnborough intended to contain the remains of Napoleon III. and the Prince Imperial. Some further details as to his architectural career will be found in our Obituary column. —The central committee for the 1900 Exhibition met last week, under the presidency of the Minister of Commerce, and has unanimously adopted the conclusions given in the report of the sub-committee to which we have already referred. M. Picard, in concurrence with the managers of the Exhibition, is to prepare a general plan of the whole proposed arrangement, which will be submitted to the sub-committee charged with the grouping and arrangement of the building. As soon as this general plan has been drawn out, a competition will be opened to all French architects, and a credit for the sums to be expended in premiums will be demanded from Parliament. It is probable that the competitors will be left free to use their own discretion as to utilising and combining with the new buildings those which were built for the 1889 Exhibition. In consequence of some paper warfare in the press, M. Charles Garnier has resigned his title of Honorary Councillor of the Société Centrale des Architectes, bestowed upon him by that body in 1891. —The Municipal Council of Paris has resolved on opening a competition for obtaining a type of school building better suited to the needs of masters and pupils, and to ensuring the best sanitary conditions. Architects, engineers, medical men, and "hygienists" will be invited to compete. —A fire at the Hôtel of the Marquisse Armand Visconti, at Paris, has destroyed a great number of works of art of great value, which the marquisse had intended to present to the Louvre. Among them were two works by Leonardo da Vinci, two fine paintings by Fromentin, and several works of Baudry, including his "Amphitrite."

GERMANY.—Professor Schaper is to be the sculptor of the proposed monument to the late Empress Augusta, which is to be erected on the Opera Place at Berlin. The Emperor has selected the design, which shows the deceased Empress in a seated position. The monument will cost 6,000l., and is to be ready by 1895. The material employed will be marble. —An exhibition of works by English water-colour painters has been opened at Berlin. —The "Rohr" Travelling Studentship for painters, which has a value of 225l. for one year, has been won by Herr Paul Hey, of Munich, a very talented young artist. —Some extensive club premises have been erected at Berlin for the Berlin Club, the planning being in accordance with English requirements. Messrs. Kayser and Von Grossheim are the architects. This is only the third club building of any pretension in Berlin. —Besides the proposed Wagner Opera House referred to on another page, Munich is apparently also to have a new Variety Theatre on the Haasle estate. This theatre is to form part of a large block of assembly and concert rooms. A hotel with some 300 rooms is to be added. The theatre is to hold an audience of 4,800. —*Deutsche Bauzeitung.* —The new post-office at Cologne has been opened by the German Postmaster-General. The block, in which room had to be found for over 2,000 officials, covers an area of nearly 21,000 sq. metres. Herr Hintze was the architect. —The competition opened for the design of a new garrison church in Dresden has been decided. The first premium has been awarded to a local firm of architects, Messrs. Lossow & Vöhveger.

Referring to some remarks on the advertisement nuisance which appeared in the *Builder*, our Berlin contemporary the *Centralblatt der Bauwirtschaft* takes occasion to remind our German confreres of a similar plague which has been steadily increasing in the German capital. —Under the auspices of the Society for Hellenic Antiquarian Research some successful excavations have been carried out in

various places of Rhenish Hesse. The graves of the Franks at Hahnheim alone yielded no less than over 400 articles, principally vases, jewelry, and weapons.—The foundations of an ancient castle, dating from 1503, have recently been laid bare at Niederolin, near Mayence. The castle was built by Bishop Berthold, and the great tower was standing up to the time of the making of the Mayence-Paris road by Napoleon I. The castle, together with the fortified town of Niederolin, formed a part of the fortifications of Mayence on the Palatinate side.

AUSTRIA.—During the progress of certain building operations at Oedenburg, in Hungary, the walls of a large Roman house were met with at a depth of about 6 ft. The walls are painted green, with dark red borders; one room shows the remains of a bath. The remains of a large statue, executed in marble, were also discovered.

NORWAY.—Twelve designs have been received for the new municipal church to be built in Oslo, the most ancient quarter of Christiania. The jury consists of five members, of whom three are leading architects. Their decision will be made known very shortly.—Work on the new Custom-House buildings in Christiania is rapidly progressing, and the first story has been finished, so that hopes are entertained of the building being taken into entire use at the end of next year. The lower story is cased externally with polished granite in two colours, a dark and a light, the latter being used in the dressings of doors and windows. The old Custom-House is subsequently to be pulled down, and broad granite quays constructed on its site, with a series of modern warehouses.—An association has been formed in Christiania for the erection of modern artisans' and workmen's dwellings.—The new Bourse at Bergen has recently been completed. It was commenced in 1888. The architect is Herr Solberg, of Thronheim, who gained the first premium in a public competition. On account of the softness of the soil, the process of piling the site occupied nearly a year. The exterior walls have been cased with dark red stone; the central wall facing the courtyard is stuccoed. The roof is mostly covered with Norwegian slates, but certain parts with copper and zinc. The two corner towers are also coppered. The external stairs are of granite, and in the interior of sandstone. Gold has been largely used for ornamentation; also stained glass windows. The floor of the bourse hall is of Bremen sandstone. As a curiosity, may be mentioned that in the vestibule is an oak stand, ingeniously divided, for 250 umbrellas, Bergen being the town in Europe showing the heaviest amount of rainfall in the year.—In the same town great improvements have been effected of late years, particularly in the construction of modern improved dwellings and the removal of old ones, built two to three centuries ago, when Bergen was a Hanse town.

DENMARK.—The foundation-stone has just been laid in Copenhagen of an asylum raised by private subscription in commemoration of the golden wedding of the King and Queen of Denmark, and named after them. The style, an imitation of that of the Charlottenborg Palace. Herr L. Knudsen, architect, has supplied the design and plans free of charge, and certain other works will also be executed gratis. An important new structure has just been added to the public buildings of Copenhagen—viz., a new Museum of Art and Industry. It is situated in the Central Western Boulevard, and has been built by Professor Vilhelm Klein, architect. Opposite will be erected the new Town Hall, and in the immediate vicinity are several other new public buildings. It is expected that the interior will be ready for reception of the collections in about six months. The museum is entered by a wide open staircase and a small antechamber, leading into a great central hall, lighted from the ceiling, with a gallery above, upon which open various chambers in the second story. The public offices, &c., are on a level with the great hall. There are three main stories, constructed wholly of iron and cement, mostly on the "Monier" system. Communications with the upper stories are obtained by a main staircase, some smaller ones, and spiral staircases, all of stone. Wood is hardly employed in the building. The façade facing the Western Boulevard contains in each of the three stories a great hall, 120 ft. in length, 32 ft. in width, and from 22 to 24 ft. in height, in which the collections are to be placed.—The work of restoring the ancient historical ecclesiastical edifice, the Helligaands Hus (House of the Holy Ghost), to which we have previously referred, has now been commenced under a State grant.—In the Danish provinces several new buildings have been completed of late. Among them is a new museum in the town of Randers, in Jutland, which was commenced two years ago. In the public competition five designs were received, of which that of Herr P. Paulsen, architect, was chosen. The style is modern Gothic, and the materials used in the construction are red bricks, granite, and concrete.—In the town of Roskilde a new communal school has been finished by Herr Meyer, architect. The building, a two-story one, is 100 ft. in length, and 48 ft. in breadth, and there are six classes on each floor.

PUBLIC WORKS IN SALONICA.—According to a recent report of the British Consul-General at Salonica, negotiations are pending between the Turkish Government and a French syndicate for the

construction of a commercial harbour at Salonica. The cost of the work is estimated at 240,000*l.* A concession for improving the river Vardar has been granted to Hamet Bey, a notable of Salonica. It comprises prevention of flooding, irrigation and improvement of navigation. The necessary surveys have been carried out by Mr. W. Kinipple, M.Inst.C.E., who has also prepared a scheme of works and the necessary estimates, plans, reports, sections, &c., at an estimated cost of 472,000*l.*, for the approval of the Minister for Public Works. Tramways six and a quarter miles in length are being constructed by a Belgian company with a capital of 60,000*l.* Nearly half the length of the line was completed and opened for traffic in May last, and it is expected that the remainder will be finished before the end of the year. The rails and most of the materials and plant have been imported from Belgium. Some Belgians with a capital of 200,000*l.*, having obtained a concession previously granted to a Turkish subject, formed a company called "Compagnie Ottomane des Eaux de Salonique" for the supply of water to Salonica. The water is brought from the plain—at about an hour's distance to the westward—to the waterworks situated outside the town, close to the Beshitchinar public gardens. From these works the water is pumped by steam-power to reservoirs in the upper part of the town, from whence it will be distributed when the works are completed—probably in October next. Along the mains are fire-hydrants at intervals of 656 ft., and seven public fountains which will be supplied gratuitously. All the necessary materials and plant were imported from Belgium, although a French company offered to supply them at 6 per cent. less than the prices charged by the Belgian manufacturers. This is a further illustration of the fact that a concession for public works in Turkey is a two-fold source of profit to the country whose capitalists obtain it.

MISCELLANEOUS

ST. CATHERINE'S COLLEGE, CAMBRIDGE. The interior of St. Catherine's College Chapel, Cambridge, is to be put into a state of highly decorative repair. It is also to have an organ loft with a new organ by Messrs. Norman & Beard, of Norwich, and a new ante-chapel. The chapel, which stands at the east end of the north side of the main court, was consecrated in 1704 in place of the old fifteenth-century chapel which—together with the north wing (1634)—had been retained at the general re-building of the college in and about 1673. The work was by John Austin, after designs by Taylor, of London; the carving by Thomas Woodward. No architect's name is given by Mr. Clark in his edition of the late Professor Willis's book, though it is conjectured in that work that perhaps a recorded payment of 100*l.* to "Robin Grumbold, the stone-cutter," indicates the authorship of its design. Robert Grumbold had been employed four years before at Clare College; and similar entries of payments to him and to a Mr. Elder, surveyor, for his journey from London, are likewise regarded as implying that Elder and Grumbold were architects for the rebuilding of St. Catherine's College during the masterships of Dr. Eachard, 1675-97, and John Lightfoot, 1650-75. James Essex designed the "Yorkshire building" which was erected in the court, opposite the chapel, with Mrs. Ramsden's bequest of 1743; he also removed the houses that blocked out the College from Trumpington-street. Until that time the college gates had been on the west side, in Queens'-lane (*olim* Milne-street), for which Sherlock master during 1714-9, and afterwards Bishop of London, gave a set of iron railings. In 1868-9, under directions of Mr. W. M. Fawcett, architect, the college authorities added an oriel to the hall, and wainscotted its interior with oak; they also inserted Gothic tracery in the windows. In 1875-6 a new master's lodge was built to the south, by Silver-street.

WATER SUPPLY OF BELGRADE.—According to a recent report of the British Vice-Consul at Belgrade upon the trade of Servia, last year Belgrade was provided with a supply of water from a spring known as "Bel Voda," which is situated about five miles from the capital, and close to the extensive marshes of Makish, whose waters are said to be prevented from mixing with that of the springs by the intervention of a stratum of impenetrable clay. Two wells have been sunk to a depth of from 65 ft. 7½ in. to 82 ft. These wells lead into a main tank, from which the water is pumped through pipes into the reservoirs of Belgrade. The reserve supply of water now commanded is said to amount to 75 per cent, and the pumps are arranged to give a pressure of from 15 to 24 atmospheres, but only from seven to eight are necessary at present to force the water into the Vrachar reservoir, which stands at a height of about 252 ft. The pumps can be worked from 20 to 22 hours out of the 24, and can supply 66,000 gallons per hour, so as to fill the reservoir in five hours. In addition to the construction of the new water tanks, the old conduits have been repaired, and hydrants placed in the streets of the town at intervals of 492 ft., but the pressure from these hydrants is too great to allow of their being used

to water the streets, the rush of water carrying away the sand in which the paving blocks are embedded.

NEW TOWER LAMP.—The illustration shows a new telescopic trestle closing so as to run through doorways only 6 ft. 9 in. high. It was supplied to the new municipal buildings at Battersea by Messrs. Heathman & Co., of Endell-street, W.C., who have also just delivered four to the Great Eastern Railway Company for the use of arc-lamp trimmers. The ladder is mounted upon four india-rubber tyred wheels, so as to be readily moved about, and rises to a height which will enable a man to attend to lamps or ceilings 40 ft. high, and is adjustable at any intermediate height by wrought iron locks which are knocked back by the ascending rungs, and fall under the rungs to retain the lifted portion at any desired height, independent of the raising ropes, which run over pulleys and are directed by the hand. The ladder sides are of Swedish fir, the rungs of Quebec birch, and the platform (6 ft. 6 in. by 3 ft.) of ash. The top has a guard rail round it, and flat table upon which tools can be placed, while 2 ft. 9 in. lower there is a platform 18 in. square upon which a person can stand. It will close down to a height of 14 ft. 3 in., and can be turned endways to run upon its own wheels through a doorway.

SALE OF AN ARCHITECT'S LIBRARY.—On Monday and Tuesday Messrs. Sotheby, Wilks, & Hodge sold at their rooms, Wellington-street, Strand, the library of the late Mr. Joseph S. Crowther, the well-known architect of Manchester. The books were of an architectural and general character, and amongst them were the following lots:—Dibdin's "Picturesque Tour in the Northern Counties of England and Scotland," plates, 3*l.* 10*s.* (Walford); "Early English Text Society's Publications," Nos. 1 to 70, 5*l.* 10*s.* (Walford); "Handbook to the Cathedrals of England and Wales," plates, 3*l.* (Galway); Hare's "Days near Rome," "Walks in Rome," "Cities of Italy," &c., 3*l.* 3*s.* (Maggs); Mrs. Jameson's "Sacred and Legendary Art," 2*l.* 18*s.* (Hopkins); "Lancashire and Cheshire Antiquarian Society's Transactions," 1*l.* 10*s.* (Hitchman); Parker's "Glossary of Architecture," plates, 20*s.* (Young); Ruskin's "Seven Lamps of Architecture," first edition, 2*l.* 10*s.* (South); G. E. Street's "Gothic Architecture in Spain" and "Brick and Marble in the Middle Ages," plates, 2*l.* 11*s.* (Pitcher); Baines' "History of the County Palatine and Duchy of Lancaster," 2*l.* 1*s.* (Daniell); Billings' "Baronial and Ecclesiastical Antiquities of Scotland," plates, 4*l.* 6*s.* (Roche); Britton's "Architectural Antiquities of Great Britain," first edition, plates, 3*l.* (Brown); Britton's "Cathedral Antiquities," plates, 4*l.* 7*s.* 6*d.* (Pitcher); "The Cheetham Society's Publications," 1*l.* 4*s.* (Pitcher); Colling's "Gothic Ornaments," 2*l.* 18*s.* (Parsons); Farwaker's "East Cheshire," 1*l.* 15*s.* (Pitcher); Grose's "Antiquities of England and Wales," with Supplement, 1*l.* 11*s.* (Maggs); Pugin's "Gothic Architecture in England," 10*s.* (Young); Taylor's "Old Halls in Lancashire and Cheshire," plates, 1*l.* 12*s.* (Pitcher); J. Weale's "Quarterly Papers on Architecture," 1*l.* 10*s.* (Young); and J. S. Crowther's "Churches of the Middle Ages," plates 4*l.* 8*s.* (Oakley); J. Carter's "Ancient Architecture of England," 1*l.* 5*s.* (Young); J. S. Colman's "Specimens of Architectural Remains," 3*l.* 3*s.* (Parsons); "Enchiridion by the Etching Club," 1879, 3*l.* 18*s.* (A. Smith); R. J. Johnson's "Specimens of Early French Architecture," 2*l.* 8*s.* (Batsford); Nash's "Mansions of England in the Olden Time," 4 series, tinted plates, 6*l.* 5*s.* (Daniell); C. J. Richardson's "Studies from Old English Mansions," 4 series, 8*l.* 12*s.* 6*d.* (Daniell). The sale of the library realised 673*l.* 16*s.*

POTTER'S PATENT FIRE-RESISTING FLOOR.—This floor, of which we give a section, is the invention of Mr. Potter, of Alfreton, well known as an expert in concrete. Mr. Potter claims many advantages for this floor—cheapness, lightness, rapidity, and ease of construction. "The floor is constructed of steel joists, and concrete in the form (a segmental arch) which gives a maximum of

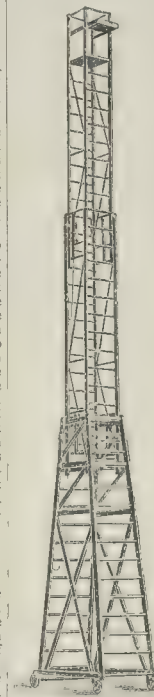
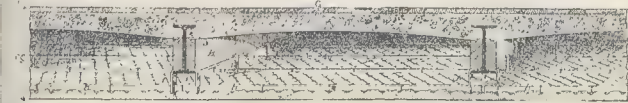


Illustration of Tower Ladder

strength with a minimum of materials. The ceiling is of ordinary plastering mortar on expanded or other metal lathing, wired to iron bars. Iron ladders, *d*, are laid on the bottom flanges of steel girders, and rigidly kept in place by bedding thereon expanded concrete blocks, *b*. Galvanized corrugated iron sheets, *e*, the ends of which rest upon the



blocks, *b*, act as permanent centres, and upon these concrete is deposited to form the floor. Iron bars, *a*, are passed through the floor, and mortices in the ladders, *dd*, expanded metal lathing is wired to the bars, *a*, and a ceiling, *e*, is formed in the ordinary manner; *A* is an air space between bottom flange of joists and ceiling." Mr. Potter states that this floor has been severely tested by fire, and that as regards strength, a trial was made for the fact that the concrete made of our parts of crushed bricks and one of cement, 1 in. thick at the springing and 1 1/2 in. at the crown, is at present loaded with 450 lbs. per superficial foot. It is stated that flooring boards may be laid straight upon it; we do not see why it should be safer to lay boarding directly on this than on any other concrete floor, except for the fact that the concrete is relatively thinner mass than in most floors, and therefore may dry more thoroughly. The hollow space between the floors, which Mr. Potter regards as a great advantage for ventilating appliances, laying wires, &c., is no doubt useful in that sense, but to our thinking is more a drawback than an advantage. We do not like hollow spaces in houses which cannot be regularly got at; one never knows what is accumulating there.

THE BRITISH PRODUCTION OF IRON AND STEEL.—The statistics issued by the British Iron Trade Association show that the total output of pig-iron in Great Britain during the first six months of the current year was 3,665,537 tons, compared with 2,790,918 tons in the corresponding period of 1892. This increase is an apparent increase for this year, although the total for 1892, for some reason, is given as 2,790,918 tons, or over 31 per cent. It is no real increase, for last year the production of crude iron was abnormally reduced by over 940,000 tons in Cleveland, Lancashire and Cumberland, owing to the Durham miners' strike. There is no doubt that the current half-year the make of pig-iron will be very much less than in the corresponding half-year of 1892, for since the end of June chiefly owing to the want of fuel through the great coal strike, no less than 95 furnaces have been put out of blast, while only six furnaces have been blown in. As such furnace produces on an average about 8,500 tons in six months, the falling-off for the half-year will be over 750,000 tons if the supply of fuel continues to be cut off. The out-put of Bessemer steel ingots in the first six months of this year was 348,712 tons, as against 649,816 tons in the first six months of 1892, an increase of 134,896 tons, or nearly 20 per cent. Of Bessemer steel rails, 317,395 tons were produced, compared with 211,884 tons, an increase of 95,511 tons, or over 45 per cent.

LEGAL. ANCIENT LIGHTS.

The case of Smith v. Mitchell came on at the 11th inst., before the Court of Appeal, consisting of Lord Justice Lindley, Lord Justice A. L. Smith, and Lord Justice Davey, it being a motion, by way of appeal, from the order of Mr. Justice North refusing to grant an interlocutory injunction restraining the defendant from interfering with the ancient lights of the plaintiff pending the trial of the action.

Mr. Lawson Walton, who appeared with Mr. Powell for the plaintiff (the appellant), said that the action was brought to restrain the erection of a party wall which obstructed the plaintiff's light, and which infringed a restrictive covenant binding both the plaintiff and defendant, and which they were entitled to enforce against each other. The plaintiff and defendant were next-door neighbours in the Marine Parade, Brighton, the plaintiff's house being No. 163 and the defendant's No. 164. Both the plaintiff and the defendant had a common source of title, their deeds containing covenants restricting any building in front of the houses over the area. In May of last year the defendant began (the plaintiff alleged) to infringe the covenant. He started from the ground-floor of his house and threw out a bow window. The defendant, although he objected, did not take any steps to interfere, as he did not wish to unneighbourly. Subsequently the defendant began to build out his drawing-room, which was on the first floor. He pulled out the face of the room, and included a balcony in front, so as to make the window face of his drawing-room the outside limit of the property. The plaintiff's complaint was that this was an infringement of the covenant.

Lord Justice Lindley (addressing Mr. Walton). You say it is a breach of the covenant?

Mr. Walton: I say it must involve an obstruction of light.

Lord Justice Lindley: The defendant has not obstructed the light yet.

Mr. Walton: Yes, he has, because he has hung

curtains there. Our affidavits show that there has been a substantial obstruction of light. We say that the projection is 2 ft. 3 in., and the defendant says that it is 1 ft. 10 in. only.

Lord Justice Lindley said that he did not understand that the area had been interfered with.

Mr. Walton said that that would depend upon what was meant by the word "area." He contended that it did not mean merely ground, but it meant the whole column of space. The covenant meant that there should be no building in that column of space, viz., in that area. It was clearly "a building" over "the area, the word 'thereon' in the covenant being equivalent to the word 'over'."

Mr. Powell having been heard on the same side, Lord Justice Lindley, without calling upon Mr. Boyce, Q.C., and Mr. Manby, who appeared as counsel for the defendant (the respondent), in giving judgment said that the injunction asked for was set out in the notice of motion, and it was to restrain the defendant from committing, or continuing to commit, a breach of a restrictive covenant subject to which he (the defendant) held 164, Marine Parade, Brighton. Mr. Justice North when the case came before him for the first time, the real controversy upon the motion turned upon the true construction of the covenant in the deed of July 1, 1846, which was the grant of the two houses which were therein recited to have been erected. The covenant relied upon by the plaintiff ran as follows:—"The areas on the other side of the said premises shall always remain and be open areas, only enclosed with iron railings and without any erection or building thereon." What had been done to that area? He (the learned Judge) was not speaking about the projection on the ground floor, because that was not in controversy, and it was not a matter they had to consider. They had to ask themselves whether the erection on the balcony, which was part of the house contained in the deed of 1846, was a building on the area within the meaning of the covenant.

He (the learned Judge) could not say that it was. It appeared to be quite plain that it was nothing of the sort. It did not diminish the area, or had it anything to do with the area. It did not obstruct the column of air over the area, and that was not a breach of the covenant, whatever else it might be. He was of opinion that the appeal should be dismissed with costs.

The other Lords Justices concurring, the appeal was dismissed with costs.

ACTION FOR THE INFRINGEMENT OF ANCIENT LIGHTS.

The case of Cosh v. Mannering came on for hearing before Mr. Justice Romer in the Chancery Division on the 17th inst., and occupied his Lordship's attention till mid-day Monday.

The statement of claim alleged that the plaintiff, Mr. Richard Lawrence Cosh, was the owner for the residue of a term of eighty years less ten days, from March 25, 1891, of certain messuages and premises known as Nos. 59, 60, 61, and 62, Watling-street, E.C., and that the London Salvage Corps (the defendants sued by Mr. Mannering) were the owners and occupiers of certain messuages and premises adjoining the plaintiff's premises, and known as No. 63, Watling-street, and that half the wall between the plaintiff's premises and the premises of the London Salvage Corps was the property of the plaintiff, and the other half was the property of the London Salvage Corps, and that such wall was a party-wall and party structure within the meaning of the Metropolitan Building Act, 1855.

The plaintiff's premises mainly consisted of two large blocks of buildings used and let out as shops and offices. One of such blocks (No. 1 block) faced Watling-street, and the other (No. 2 block) was built about 12 ft. in the rear of No. 1 block, and both blocks were connected by a flat with a skylight or glass roof covering in the "well" or space between such blocks to the height of the ground-floor thereof. No. 1 block contained (1) a doorway and four windows on the first floor, (2) five windows on the second floor, and (3) five windows on the third floor, all opening and looking on or into the well or space between such blocks. No. 2 block contained (4) a doorway and three windows on the first floor, (5) four windows on the second floor, and (6) three windows on the third floor, all looking on or into the well or space between such blocks.

The statement of claim also alleged that the plaintiff's premises had all been recently rebuilt, but as to No. 1 block (1) part of the doorway and of each of the windows on the first floor, (2) part of each of the five windows on the second floor, and (3) part of four of the windows on the third floor were ancient lights. And as to No. 2 block (4) part of the doorway and of all the windows on the first, second, and third floors thereof were ancient lights. The skylight also was one of the plaintiff's ancient lights. The plaintiff complained that in consequence of the London Salvage Corps having without notice to him, or with his consent, raised and heightened their party-wall and the flues and chimney shafts to the height of 10 ft. or thereabouts, it had materially and grievously darkened, injured, and obstructed his ancient lights, as the same were enjoyed previously to the rebuilding of his premises.

The plaintiff also alleged that the London Salvage Corps in raising and heightening the party wall trespassed on his premises, and damaged them by breaking mouldings, eaves, gutters, and glass in the skylight, and further that the London Salvage Corps not having carried up to the requisite height the flues and chimney stacks belonging to him (the plaintiff), on or against the party wall, caused him damage by smoke from the flues and chimney stacks.

The plaintiff claimed 750*l.* damages for the acts and trespass he complained of, and also a mandatory injunction against the London Salvage Corps, that they should forthwith remove so much of the party wall which they had raised and heightened.

The statement of defence was a general denial of the allegations set out in the statement of claim. Mr. Ralph Neville, Q.C., M.P., and Mr. Wilkinson, appeared as counsel for the plaintiff, and Mr. Haldane, Q.C., M.P., and Mr. John Henderson, represented the defendants.

The expert evidence on behalf of the plaintiff was given by Mr. Edward Augustus Gruning, 25, Gresham-house, architect and surveyor; Mr. James Edmondson, 42, Old Broad-street, architect; and by Mr. William Henry Duffield, the plaintiff's architect.

The expert evidence on behalf of the defendant was given by Mr. William Wimble, the defendant's architect; Mr. Henry Currey, 37, Norfolk-street, Strand, surveyor; and by Mr. Alexander Rose Stenning, 121, Cannon-street, E.C., architect and surveyor.

At the conclusion of the evidence, his Lordship intimated that he did not require to hear addresses from counsel, and proceeded to give judgment. He said that with regard to the question as to the interference with the lights, on the evidence, he came to the conclusion that the chimney-stacks had caused no substantial interference with the plaintiff's lights. Certainly it would be impossible for him, even if he had thought there was some nominal interference, to fix any sum representing it on the evidence before him. The plaintiff's witnesses on the question of damage, though they made out nominally a certain amount of pecuniary damage by reason of the alleged interference of light, yet on cross-examination it appeared that they had assessed the damage on a totally erroneous basis. After hearing the plaintiff's evidence, and the whole of his expert witnesses, and the evidence of the defendant's experts, he came to the conclusion that there was no substantial interference with the plaintiff's ancient lights at all. The plaintiff was entitled to relief so far as concerned the raising by the defendants of the stack of chimneys which was called stack No. 2. It was admitted that the defendants had no right to raise that stack in the way they did without also raising the plaintiff's stack of chimneys which were adjacent, and it had been agreed between the parties that the plaintiff should be at liberty to raise his stack of chimneys to the same height, and that the costs of that should be paid by the defendants. That cost had been agreed at the sum of 20*l.* There was before him no evidence on which he could rely, and which would enable him to say that the plaintiff, as owner of the two blocks of houses, had suffered damage by reason of the smoking of his chimneys, in consequence of the erection by the defendants of the stack No. 2. It did appear from the evidence of the plaintiff and another witness of his, that undoubtedly some of the tenants of his (plaintiff's) premises had suffered some inconvenience by reason of the smoke, and no injury to the tenancy was proved before him, and no injury to the plaintiff. That being so, he could not give the plaintiff any damages beyond the 20*l.* he had mentioned. That disposed of the whole action, and all he had to do was to determine how the costs should go. The action, except so far as related to the damage which had been estimated at 20*l.*, was entirely failed, and therefore he must dismiss the action with costs, except in so far as it sought damages for the raising by the defendants of their wall and chimneys in such a way, without raising the plaintiff's chimneys, to which he had referred. So far as the action sought relief in respect of the last-mentioned damage—which had been assessed at 20*l.*—the defendants must pay the costs of the plaintiff as a set-off, and he thought it right, having regard to the allegations in the statement of claim with regard to the last-mentioned costs, that the taxing-master should bear in mind the small amount recovered, having regard to the amount claimed.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
Drainage and Water Supply Scheme, Southampton.	Plumbers R.S.A.	15 Guineas.	Jan. 20/94
Shelters, Sea Bath, &c. &c.	Southern Iron Works Corp.	250 150 and 100.	Jan. 31

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Water Shaft, Langley.	Heaton Local Board.	J. H. Brook.	Nov. 28
Whitstone Road Metal 600 tons.	Northumberland C.C.	Official.	do.
* Making up Roads.	Barton (Survey), L.B.	do.	Nov. 29
The Tall Chimney.	Leeds Corp.	do.	do.
Well Sinking, Malahide, Ireland.	Bainthorpe Union.	C. M. Tule.	do.
Dispensary, Kildare, Ireland.	Do.	do.	do.
Six Cottages, Dordrecht-road, Barnaby.	Do.	do.	do.
Road Works, Beaumont and Lily-street.	Do.	do.	do.
Street Works, Faversham.	Do.	do.	do.
San. &c.	Do.	do.	do.
Southern House, 30, Southill-lane, Bath.	Seaford Loc. Bd.	F. S. Yates.	Nov. 20
Sewerage Works.	Do.	H. B. Baskley.	do.
Baths (Wentworth-street).	Do.	B. Latham.	do.
* Additional Stabling, Birmingham.	W. R. Co.	Official.	Dec. 1
Excavating and Hill Works.	Caversham Oxon. Loc.	do.	do.
Making up Roads.	Do.	do.	do.
Making-up Langton and other Roads.	Do.	do.	do.
* Supply of New Stones, &c.	Do.	do.	do.
Iron Railings, &c. Recreation Ground.	Do.	do.	do.
Hospital, Great Baddow.	Do.	do.	do.
* Alterations, Ayr, Ayrshire.	Do.	do.	do.
* Completion of Certain Passages.	Do.	do.	do.
Sewers, Northey Moor, &c.	Do.	do.	do.
* Three Iron Utinals.	Do.	do.	do.
Five L. E. Tanks.	Do.	do.	do.
Water Works, Dungiven, Ireland.	Do.	do.	do.
* Cast Iron Works.	Do.	do.	do.
Permanent Way Materials.	Do.	do.	do.
Additions to Schools.	Do.	do.	do.
	Local Board.	C. Periwé.	do.

CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Sewers, Church-street and Priory-lane.	King's Lynn Corp.	E. J. Bidcock.	Dec. 8
Sewering, &c. Vicarage-grove.	Do.	do.	do.
School Buildings, &c. Thane, Somerset.	Do.	do.	do.
* Making up and Paving Road.	Do.	do.	do.
* Collection of Dist. Ashes, &c.	Do.	do.	do.
Manufactory, Willow-lane, Hodderfield.	Do.	do.	do.
Board Office, &c.	Do.	do.	do.
* Engine House, Workshop, &c. &c.	Do.	do.	do.
School Buildings, &c. Thane, Somerset.	Do.	do.	do.
Harbours, &c. Breakwater, and Ugs.	Do.	do.	do.
Ice of Law.	Do.	do.	do.
School Buildings, &c. Thane, Somerset.	Do.	do.	do.
Genetery Chapel.	Do.	do.	do.
* Water-las, Sewerage, &c. Works.	Do.	do.	do.
* Ring Office, East Croydon.	Do.	do.	do.
Extension of Electric Light Station.	Do.	do.	do.
Leighton Buzzard Ld.	Do.	do.	do.
* Harrogate Corporation.	Do.	do.	do.
Portsmouth Sch. Bd.	Do.	do.	do.
* West Ham Sch. Bd.	Do.	do.	do.
Wollaton School Bd.	Do.	do.	do.
Borough Club.	Do.	do.	do.
War Department.	Do.	do.	do.
West Riding of Yorkshire County Council.	Do.	do.	do.
* New Bakehouse, &c. Islington.	Do.	do.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
* Clerk of Works.	West Riding of Yorkshire County Council.	3l. 10s.	Nov. 27
* Junior Architectural Assistants.	London County Council.	do.	Dec. 8

Those marked with an Asterisk (*) are advertised in this number. Competition, p. iv. Contracts, pp. iv, vi, vii, ix, and xxi. Public Appointments, pp. xviii.

MEETINGS.

FRIDAY, NOVEMBER 24.

Architectural Association.—Mr. H. W. Barnes on "Hard Wood Joinery," with examples. 7.30 p.m.
Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Professor A. Wynter Blyth on "Sanitary Law: English, Scotch, and Irish; General Enactments Public Health Act, 1875; Model By-laws, &c." 8 p.m.

SATURDAY, NOVEMBER 25.

Queen's College, Cork.—Mr. Arthur Hill, F.R.I.B.A., on "The History of Architecture." 1. 3 p.m.

MONDAY, NOVEMBER 27.

Society for the Promotion of Hellenic Studies.—Extra General Meeting. Mr. Arthur Evans on "A Mykenian Treasure from Agia." 5 p.m.
University College.—Lectures on "Chaldean and Assyrian Archaeology," by Mr. W. St. Chad Boswell. VI. "Assyrian Art." 5 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Dr. Louis Parkes on "Sanitary Laws and Regulations Governing the Metropolis." 8 p.m.
London Institution.—Mr. A. Boys on "Zante and its Earthquakes." Illustrated. 5 p.m.
Society of Arts (Lecture).—Mr. Henry Blackburn on "The Art of Book and Newspaper Illustration." 8 p.m.

TUESDAY, NOVEMBER 28.

Institution of Civil Engineers.—Discussion upon the papers on "Impounding-Reservoirs in India, and the Design of Masonry Dams," by Mr. Clerke, Mr. Sadayev, Colonel Jacob, and Professor Kreuter. 8 p.m.
Glasgow Architectural Association.—Smoking Concert and Exhibition of Drawings.

WEDNESDAY, NOVEMBER 29.

South Kensington Museum (Lecture Hall).—Lecture on "Greek Sculpture," by Miss E. Sellers. "Praxiteles." II. 5 p.m.

Northern Architectural Association (Newcastle). (i) Address by the President. (ii) Mr. E. Eugene Brown on "Electric Lighting." 7.30 p.m.

Society of Arts (Lecture).—Mr. Richard Evans on "The Regulation of Street Advertising." 8 p.m.

St. Paul's Ecclesiastical Society.—Paper by Mr. J. Ninian Comper entitled, "Practical Considerations on the Gothic Altar, and certain Dependent Ornaments." 7.30 p.m.

THURSDAY, NOVEMBER 30.

Arts and Crafts Exhibition.—Mr. W. B. Richmond, A.R.A. on "Mosaic." 8.30 p.m.

University College.—Lectures on Greek Sculpture: "Phedias to Lysippos," by Professor Percy Gardner. VII. "Scopas and the Mausoleum." 5 p.m.

Sanitary Institute (Lectures on the Sanitation of Industry and Occupations).—Dr. J. T. Arledge on "Textile Manufacturers, Silk, Cotton, Woollen, and Linen Industries." 8 p.m.

Society of Antiquaries.—8.30 p.m.

FRIDAY, DECEMBER 1.

Institution of Civil Engineers (Students' Meeting).—Mr. Leonard H. Appleby on "Forms of Tensile Test Pieces." 7.30 p.m.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

22,393.—**WINDOW FASTENERS:** D. Atkinson.—According to this invention, a metal plate with a bar attached to it, and a Z spring is made just high enough to allow the sash-bar to shoot under one end. To open the window, the forefinger is placed under the projection of the spring, and to open the window the spring is lifted up.

23,354.—**PIPE-JOINT OR COUPLING:** T. Holmes and another.—This patent relates to pipe-joints or couplings. The inner surfaces of the flanges by which the adjacent ends of pipes are connected together are corrugated, the corrugations being arranged so that the projecting parts of one flange fit within the hollows of the other flange. This avoids the necessity of employing insertions of rubber, or using white or red lead, &c.

23,413.—**WATER SUPPLY FOR WATER CLOSETS:** J. Shanks.—According to this invention, the cleansing water is supplied to a hollow rim, whence it finds its way into the basin through two or three sets of holes. The holes of one set are placed and shaped so as to direct part of the water down the sides of the basin; and the holes of another set are placed so as to throw water inwards from the rim in a shower converging from the middle of the basin; and a third set is sometimes placed intermediately between the two sets. A further improvement is the fixing of a small pipe at one side of the basin, to prevent syphoning when a large quantity of water is thrown into the basin. These are substantially the main improvements, although some minor details are incorporated in the specification.

23,474.—**METAL LATTICE:** S. Grüber (Munich).—This invention has for its object an improvement in making the lattice so that the bands are parallel to each other, at certain distances apart, and bent in a trapezoidal or zig-zag manner, so as to occupy the spaces between the straight bands, and form connexions between them at numerous points. This method gives great rigidity in the plane of its extension and great strength against compression. It also presents great tenacity and tensile strength against lateral pressure or pull in the direction of its extension.

4,045.—**HAND-PRESS FOR BRICKS AND TILES:** R. H. Ketchum.—This invention relates principally to mechanical details in the ordinary brick-pressing machine. The end of the weighted lever is adjustable, and the crosshead is also adjustable vertically, being mounted on screw threads, side rods, and secured by upper and lower regulating nuts.

5,097.—**WATER-SUPPLY VALVE:** J. Shanks.—The distinctive feature of this valve, which forms the subject of the patent, is that it has a valve-piece movable by a foot lever against the water pressure, and closing on a seat encircling a relatively large aperture or port, the foot lever being arranged to act on the valve-piece only when nearly at its highest position. An additional stop valve is also fitted.

11,452.—**DEAD SAWING FRAMES:** E. Barnes.—According to this invention, any number of saws may be compressed by cranks, and the whole tightened up to proper tension without the use of buckles and keys.

NEW APPLICATIONS FOR LETTERS PATENT.

NOVEMBER 6.—21,007. A. Beady, Closet Outfall, Connecting Sleeve or Thimble for Pipes.

NOVEMBER 12.—21,012. P. Winn, Waste Fittings for Baths, Lavatories, Sinks, &c.—21,013. T. Less, Wood-planing Machines.—21,067. S. Elgar,

Hanging Window Sashes.—21,092. J. Churchill, Water waste Preventers for Flushing, &c.

NOVEMBER 7.—21,101. P. Winn, Flushing Cisterns, &c.—21,105. F. & H. Leung, Slip-preventing Screws.—21,106. M. Adams, Sanitary Flushing Apparatus.—21,114. J. Campbell and F. Greenwood, Guard or Cover for Wood-cutting Machinery, &c.—21,136. J. Ricketts, Spirit Levels.

NOVEMBER 8.—21,137. J. Ricketts, Spirit Levels, &c.—21,174. J. Wilson, Joiner's Cramp.

NOVEMBER 8.—21,218. R. Crosthwaite, Fire Grates.—21,228. J. Cape and J. Williams, Opening and Closing Sashes and Casements.—21,237. S. Hill and G. Mackay, Door Springs and Door-closing Apparatus.—21,274. G. Law, Jun., Ventilating Device for Sewers.

NOVEMBER 9.—21,292. A. Patrick, Manufacture of Portland Cement, &c.—21,293. S. Ford, Sash-fasteners.—21,300. J. Dunn, Gravity Butts or Haps for Cupboard or other Doors.—21,304. D. McLean, Waste-preventing Valves for Water-closet Service Cisterns.—21,338. A. Boulton, Fasteners for Doors, Shutters, &c.—21,351. M. Breathing Machinery for Moulding Bricks.

NOVEMBER 10.—21,378. J. L. and J. Sharratt, Terra-cotta Chimney-tops, &c.—21,394. W. Keith, Testing and Flushing Drain-pipes, &c.—21,472. W. Wheeler, Syphon Cisterns and Water Waste Preventers.—21,493. A. Brown, Water-tight and Fire-proof Doors.—21,503. W. Duncan, Roof and Floor Tiles and Method of Laying and Fixing Roof Tiles in Roof Framings and in Bricks in Building and Flooring Purposes.—21,508. W. Stevenson, Kils, fired from Sides or Top, for Drying and Burning Bricks, Tiles, &c.—21,549. C. Brentano, Kils or Furnaces for Burning Cement, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

16,808. W. Millar, Pedestal Closet-seat Fastener.—16,814. T. Hyom, Combining Door Siam and Door.

17,761. R. Iddon and S. Roston, Fixing Tiles in Stone places and Stoves.—18,975. F. Richmond, Sanitary Traps and Baths, Lavatories, and Similar Purposes.—19,087. J. and E. Robbins, General.—19,154. J. Wild, Ceiling Projector.—19,266. J. Taylor and I. Earnshaw, Window Fasteners.—19,309. F. Rust, Joining or Connecting Pipes or Tubes.—19,348. R. Roman, Soldering Irons.—19,408. J. Robertshaw, Sash Fasteners.—19,418. J. Boyle, Stoves.—19,600. J. Owen, Fasteners for Sliding Doors, &c.—19,611. E. Eckel, Incandescent Bodies for Incandescent Gas-Lights.—19,645. A. Stafford and J. Dickinson, Sash Fasteners for Windows.—19,691. H. Dickinson, Time Apparatus for Automatically Switching Gas and Electric Lights.—20,007. H. Defries, Automatic Indicator for Lavatory and Other Doors.—20,126. W. Bull, Burning Bricks.—20,236. M. J. Noad and S. Ziani de Ferranti, White Lead.—20,237. J. Woodward, Devices for Lifting or Removing Paving Blocks from their beds.—20,300. J. Hatchler, Ladders.—20,316. E. Claremont, Right and Left Fittings.—20,457. J. Reid, Valve Closets.—20,473. S. Addison, Drain Stoppers.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

22,631. J. Holland, Double Socket for Rain Water Pipes.—15,204. R. Pancoast, Ventilators or Chimney Cowls.

Simon Johnson, Manchester (accepted)	3,139	5	4
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W. Vaughan, Manchester	28 12 6	28 12 6	28 12 6	28 12 6	28 12 6	28 12 6	28 12 6
Hy Davis, Manchester	28 12 6	28 12 6	28 12 6	28 12 6	28 12 6	28 12 6	28 12 6
Surveyor's estimate	77 3 0	28 12 6	28 12 6	28 12 6	28 12 6	28 12 6	28 12 6

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WRI. HAM.—For the extension of Salford-road, for the
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W. E. Samuel, 17, 18 0 0
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Broken Granite, Barnet.—Owing to a printer's error, we last
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accepted for the above contract. This was an error, as Messrs.
E. J. Van Praagh & Co. were accepted.

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VOL. LXV. No. 2652

DECEMBER 9, 1895.

ILLUSTRATIONS.

The Ancient Cathedrals of Scotland: VI., Dunblane: from the South-West.—Drawn by Mr. Alexander McGibbon *Double-Page Photo-Litho.*
 Plan of Dunblane Cathedral.—Drawn by Dr. Rowand Anderson *Double-Page Photo-Litho.*
 View of Nave, Dunblane Cathedral, before Restoration.—Drawn by Mr. R. Phené Spiers, F.R.I.B.A. *Double-Page Ink-Photo.*
 New Windows for the Cathedral of Orléans, illustrating the History of Joan of Arc.—Designed by M. Jacques Galland,
 in collaboration with M. Gillet *Double-Page Ink-Photo.*

Blocks in Text.

Sketches of Fountains pages 498, 499 Sketches of Dunblane Cathedral pages 413, 414, 415, 416, 417
 Diagrams illustrating article on "Geology" (Students' Column) page 419

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Barry Dock and Town.



IT is customary to cite the cities of America as instances of rapid development, as if examples were unknown in this country. This to some extent arises from the tendency of the average Briton to rush away from his own country to see what may be remarkable outside his own island, neglecting almost wholly what is noteworthy within it. The creation of Barry is in its own way quite as remarkable as anything which the United States can show us, for a large and growing town has been created in a few years, bordering on what is undoubtedly one of the finest and most complete set of docks in the world—and, so far as regards the particular use to which it is chiefly put, the first in the world. As regards equipment and convenience, Cardiff, large, populous, and splendidly supplied with docks, has been growing gradually; from a mere fishing hamlet it has developed into a great coaling port. But the difference between the growth of one place and the creation of the other will be more obvious when it is pointed out that the West Bute Dock, the earliest of the Cardiff Docks, was not opened until 1839, yet before that date vessels congregated at Cardiff, and the Dock was opened, not to bring traffic, but to meet that which existed, as well as to enlarge it in the future. In 1835 the East Bute Dock was opened; this is the largest of the three Cardiff Docks, covering an area of 64 acres; and this was followed by the Roath Dock in 1887. But when certain merchants, shipowners, and colliery proprietors decided to make a dock at Barry, they merely chose a place which was likely to be convenient for the collieries, and more accessible than Cardiff, since it lay seven miles lower down the Bristol Channel. But it was a bare expanse of marsh and mud—dock and habitations had to be created at a blow. The work was begun in 1884, and in June, 1889, Barry Dock, covering an area of 13 acres, was opened. Traffic had not to be

fostered or sought for; it came, if we may so say, in a heap, for in the half-year ending December, 1889, the dock was used by 598 vessels, with a tonnage of 567,000 odd tons. In the corresponding period of 1890 the number of vessels had risen to 841, and the tonnage to 828,000 odd, whilst for the half-year ending December 31, 1892, the number of vessels was 1,034, of which the tonnage was 1,074,996. It is not yet five years since the Dock was opened, but round it is now dwelling a population of between thirteen and fourteen thousand persons; churches, schools, banks, and hotels—all the buildings required for the moral, religious, and material welfare of a community have sprung into existence. There is railway communication with all parts of England, so that one may say almost instantaneously a commercial undertaking and a commercial community were created. It is customary to look in Wales for the picturesque, but this creation of modern enterprise is, in many respects, more remarkable than even the phenomena or the beauties of nature. From the architect's point of view it must be admitted that there is little to be said as regards either the new town of Barry or the new part of Cardiff. A number of brick houses, all of the same character, and very largely of the same size, have been erected; there is no attempt to charm the eye—so long as they can hold a certain number of inhabitants and keep out wind and wet, the object has been attained. The contrast between the solidity of Barry Dock and the perfection of its mechanical appliances, and the monotony, the mediocrity, and the superficiality of the surrounding houses, is very marked; and it cannot but be a matter of regret that, in such places as Barry and Cardiff, some attempt is not made to erect buildings pleasing to the eye, with open spaces and trees and gardens. It is the disgrace of English seaports that, round the finest engineering works, are often seen the worst of buildings of a domestic or social character, even though in places such as Barry there is opportunity for a new departure.

There are, however, two other points, in regard to which the success of Barry Dock is important. In one sense,

it is a co-operative undertaking. That is to say, most of the large shareholders and those who were instrumental in its creation were persons who would in one way or another use it. Some were shipowners, others colliery owners, and thus it was unlike many undertakings the property of persons having no sort of interest in common with those who use them. Nor, again, was it promoted by persons desirous of getting the public to take up the shares. Probably this has been one secret of its financial success. It was not like many undertakings which are sound in principle but are over capitalised. Its shares now stand at 100 per cent. premium, so that those who were prudent enough to take part in the undertaking from the beginning have doubled their capital. Again, too, it is an example of the success of undertakings which are intended not by their creation to bring together a business, but to tap, so to say, one already full of life. The great area of the South Wales coalfields was ripe for a new channel of communication with the world, and so from the very moment of the opening of the Barry Dock vessels sailed from it to every quarter of the globe. So great has been the success of the existing dock that it is in contemplation at no distant date to almost double the present accommodation, whilst in about a year's time a new deep-water lock will be completed, which, together with some further dredging of the channel, will enable vessels to enter at all times of the tide.

We have dealt in the foregoing remarks with the general aspects of this great undertaking, and we do not propose to enter into descriptive details. It may, however, be desirable to point to one or two particulars which serve to illustrate the completeness of the work. First and foremost are the eleven high-level tips or staithes. These are high above the level of the dock and in connexion with the railway, and their advantage is that a truck has simply to be run along them, arrived at the end it descends on the platform to the shoot, is tipped, re-ascends, and runs back along a different line. As it passes along what may be termed the up line, it crosses a weigh-bridge, which records its full weight; as it passes back it crosses another

weigh-bridge, which records the weight of the truck alone. The exact quantity of coal deposited by each truck in the vessel is thus accurately registered, and the actual quantity shipped is thus known, and all disputes as to the amount of the cargo are prevented. As many of our readers may be aware, the weight of a waggon varies according to the state of the weather, and thus the weight printed on it cannot be regarded as accurate. When, therefore, a full waggon only is weighed, and the weight of the waggon itself as printed on it deducted, an accurate measurement of the ship's cargo is not always obtained. We have said that there are eleven of these high-level tips; each tip can discharge sixty waggons in an hour; indeed, sixty-eight waggons have sometimes been discharged. In other words, a vessel can be loaded at the rate of 600 tons per hour, so that if the eleven tips were all working at once, more than 6,000 tons can be put on board in an hour from the part of the dock where these particular tips are placed. But, in addition, there are eight low-level staiths. We may speak of some of the other excellences of this dock in a few words. It is lighted in every part with electricity, so that, as one result, the work of loading vessels can, in ordinary weather, be carried on with as little difficulty by night as by day. The gates are opened and closed, the capstans and all the machinery are worked, by hydraulic pressure, and the graving docks are emptied with rapidity by powerful pumps. The day must eventually come when the coalfields of South Wales will be exhausted, and when it does the site of Barry Dock and Town will, doubtless, revert to its former desolation. But that time belongs to the dim and distant future, and for some generations the work which we have described will, doubtless, grow, existing as a striking example of the commercial energy and of the constructive capacity which is a characteristic of the English race.

AN ARTIST'S PLEA FOR GOTHIC.

MR. WILLIAM MORRIS exhibits, in his critical attitude in regard to modern architecture and its possibilities, a remarkable example of sturdy independence and persistence of opinion, in contrast with the fluctuations of taste and feeling which have characterised English architects in the present century. Among the latter the worship of Gothic, as the starting-point for a new birth of architecture, seems to be nearly dead, and even with those who continue to work more or less in the spirit of Gothic architecture there is to be seen an increasing tendency to soften away the characteristic qualities of Gothic, and to mingle with it details derived from Classic architecture; while not a few of those who commenced as Gothic architects have practically dropped their allegiance and become confessed adherents of "Free Classic."

Mr. Morris will have none of this, and one of the uses to which he has turned his recent experiments in the art of printing has been to reissue from the "Kelmscott Press," as an example of the artistic make-up and printing of a book, a lecture on Gothic architecture delivered at the Arts and Crafts Exhibition in 1889; a little square grey volume printed in thick old-fashioned type, with ornamental initial letters to each paragraph, conventionalised leaves instead of "full stops," and those unequal margins, graduated in width from the narrow inner margin to the proportionately increasing margins at the top, outer edge, and foot of the page; an arrangement which we quite agree with him in liking. As to the general aspect of the print, for reading, we confess that we find it rather disturbing than soothing to the eye, and we fear that those whose business or pleasure it is to read many books would hardly be thankful if they were all printed in this fashion.

It is not unsuitable, however, to the book

in question, which does not consist of lengthily reasoned paragraphs, but enshrines a number of unorthodox and (to the reader of the present moment) startling judgments in regard to architecture, past and future, in which very large questions are disposed of in very few words. There is nothing in it, indeed, which we have not heard before, and a good deal of it is what many people thought was done with. To find it all brought down upon us again afresh, in the most uncompromising manner, is the curious and unexpected element.

It is the old story again: that Greek architecture had no element of development; that the Renaissance was an overturning of the whole principle of architecture, an imitation of an imitation; that in Gothic alone the true spirit of architecture is to be found, and the possibility of further development. There are special points, however, in Mr. Morris's way of putting it. After dividing the whole of architecture into two groups, Classic and Mediæval, he subdivides the former into two, Barbarian (in the Greek sense) and Classical. The object of this subdivision is to urge that the Greek style, "the bones of it, its merely architectural part, is little changed from the Barbarian or primeval building, which is a mere piling or jointing together of materials, giving one no sense of growth in the building itself and no sense of the possibility of growth in style." He admits that the Hellenic style appears to us to be, within its limits, one of extreme refinement, "and perhaps seemed so to those who originally practised it." The reader should note the significance of that "perhaps," and the extent of the questions it lays open. That is a remarkable sentence, and deserves to be pondered. It might be applied to Greek sculpture also, and the question raised whether what we think so admirable appeared more to the Greeks than an everyday craft practised in the only way in which it occurred to them to practise it. But did Mr. Morris take into account what we now know of the optical refinements of the Parthenon, or is he, possibly, not much acquainted with them? It would hardly seem possible that such care should have been taken to provide accuracy of optical effect unless those who carried out the building attached great importance to it. Still, we must admit the suggestiveness of Mr. Morris's "perhaps." With the view taken of Roman architecture we differ little; it is expressed in a very significant and picturesque manner. "To criticise it from the point of view of to-day would be like finding fault with a geological epoch, and who can help feeling touched by its remnants, which show crumbling and battered amidst the incongruous mass of modern houses?" Yes, or by the Merovingian roofs thatched upon the old stumps of columns, or Goethe's Italian peasant's house nestled among a temple's ruins. In that sense, it is one of the most picturesque and poetic chapters in architectural history; decay has robbed it of its vulgarity, and left only its grander element. Its mischief, in Mr. Morris's view, lies not in its dead remains, but in its modern influence, and perhaps we need not differ from him there. "The New Birth (Renaissance) was bound to the dead corpse of a past art." On every other side men were to look forward to some change, good or bad; on the side of art (or at least of architecture, as we should amend the statement) they were told only to look back. This is true enough, but Mr. Morris, like Ruskin, does not recognise that the Renaissance architects after all did something more than merely look back. Does he mean to deny the existence of any new and genuine architectural element in the Florentine palaces, for instance? That he can see nothing to admire in such a building as St. Paul's he frankly tells us. He has "found it difficult to put himself into the frame of mind which could accept such a work as a substitute for even the latest and worst Gothic building," and he regards St. Peter's and St. Paul's as buildings which

"were not built to be beautiful." This view was a popular one in the days of the Gothic revival. It seems to us only an indication of a bounded and doctrinaire view of architecture. Granted that the principles of building in St. Paul's are wrong, and (we should add) that the details are very bad, the grand aspect of the whole is really a refreshing proof that even a false system cannot crush out the genius for great effect in architecture. The details of St. Paul's may be "pedantic imitation;" the whole is a glorious creation; it is Mr. Morris's misfortune if he cannot feel that, and we fear this limitation in his powers of admiration is really the result of social and political feelings—shall we say prejudices—which ought not to interfere with questions of pure art. With Mr. Morris there can be and shall be no art but an art of the people; and Gothic architecture is the architecture of the people, "that uses the hands and wills of men as instruments of creation."

Of the degree of truth and importance in this half-truth much might be said, but we turn to the ostensible reason put forward at the close of Mr. Morris's essay, why we should turn once more to Gothic architecture as a starting point: "An organic style cannot spring out of an eclectic one, but only from an organic one." Why, what did Gothic architecture itself spring out of but an eclectic style? What was Spalato, the first warning of Gothic, but an experiment in eclecticism? Or what was the early French Romanesque, with its odd mixture of reminiscences of Classic detail? On the other hand, it might be argued, with equal plausibility, that you can evolve nothing further out of an organic style which has run its course and come to its decay; unless, indeed, you deliberately choose an earlier period of it and start afresh from that. We have tried that already, and the result has not been a success.

It appears to us that Mr. Morris, in his semi-political doctrinaire view of the matter, ignores the fact that there is a certain amount of work being carried on now, by some of our best architects, which is in the very spirit which he is looking for. A good deal of the Free Classic building of to-day, the best of it, is being carried on with that desire to make the most of the handiwork of the craftsman, in subordination to the general idea of the architect, which was the characteristic of Gothic architecture, and with an attention to the true and workmanlike treatment of detail in relation to the nature of the material, which is quite distinct from that mere paper designing in the office which was the habit of the Classic architect of our earlier days. There appears to us to be a chance of new life for architecture in this direction which there certainly would not be in "trying back again" for a re-development of Gothic architecture; and while dreaming of impossible results from this process, which has been tried and found wanting, Mr. Morris overlooks a more hopeful course which is to some extent actually being taken in hand around him.

NOTES.

THE special meeting called by the Hellenic Society on the 27th ult. was certainly one of exceptional interest. Mr. Arthur Evans read a paper on a "Mycenæan" treasure found in Ægina, and acquired by the British Museum. A detailed examination of the various objects included in the hoard led to the conclusion that in many particulars this new "Mycenæan" find corresponded to the antiquities discovered in other parts of Europe, and attributed to the late bronze and early iron age—e.g., an open metal-work design representing the familiar scheme of the fowler holding two birds by the neck, was paralleled by designs found in Northern Italy, e.g., near Bologna and Vetulonia, and the pendant ducks and disks appear on the well-tombs of Italy and

Austria, and as far afield as the Caucasus. Mr. Evans's main conclusion was that the Ægina treasure gives additional data for the theory, now fast gaining ground, that "Mycenæan" art and culture was of indigenous growth, though strongly influenced by the East; he further stated that he believed it could be dated as far back as the sixteenth century B.C., its culminating point being in the fifteenth, and its third period lasting down to about 800 B.C. The paper will shortly be published in the Society's journal, when the evidence can be fully weighed. Meantime, we may note that it throws considerable light incidentally on two questions, the early history of Ægina and the origin of the Greek standard of coinage. The famous issue of Pheidon, Mr. Evans believes, was an innovation probably based on Dorian influence—the older standard, ultimately embodied in the Euboic and Attic coinage, dates, he thinks, back to Mycænæan days. A notable, and, we think, necessary, protest was raised against the narrow local jealousy that would forbid the export of small objects of jewellery and the like from Greece. Such minor antiquities suffer nothing from transportation and were always objects of commerce; as the speaker neatly observed, it is hard indeed if other nations may not collect a few playthings from the cradle of antiquity. After some discussion, in which the speaker's father, Sir John Evans, took part, Mr. Arthur Evans startled the meeting by announcing that on Greek soil he had discovered a new system of hieroglyphics. They were of undoubtedly Greek provenance, and of no known type, either Egyptian, Assyrian, or Phœnician. Can they be of the sort that so sorely puzzled Agassiz that when he opened the tomb of Alkmenæ at Haliartus he had to send to the wise men of Egypt to interpret them? Will they throw light on the Pelasgian (?) inscription of Lemnos?

IT is much to be regretted that the Government has refused to allow the House of Commons to accede to the motion passed in the House of Lords, that a Joint Committee should be appointed to consider the subject of betterment. No doubt the House of Commons came to a decision on the particular Bill of the London County Council which was laid before them, but one of the reasons urged for accepting betterment in that Bill was that it was so infinitesimal in amount that it could hurt no one. As we have over and over again stated, the subject should be settled once for all, and if the principle of betterment is to be applied, it should be applied all round, to improvements in the smallest towns in England as much as to those in the Metropolis. Until a general rule, with the manner of its application, is laid down, if there is to be a tax of the kind at all, there will be constant legislative conflicts over this subject. Thus it is more than probable that if the House of Commons would have agreed to join in the proposed committee, the London County Council might in a reasonable time have been able to insert in their Bills some general provision on this subject. On the other hand, if the committee had come to a decision that though the idea was reasonable, its equitable application was impossible, then the matter would have been at an end. As it is, we may expect the subject to be yet the battle-ground of many Bills.

THE Select Committee on Railway Rates and Charges have Mr. Shaw-Lefevre's draft report under consideration this week. Sir Albert Rolit champions the cause of the traders, and brings forward some rather drastic recommendations. One suggestion is in the direction of protecting traders against arbitrary and excessive rates of any description—no matter whether they have been advanced, or whether they are or are not within the authorised maximum. It may be urged that the whole of the maximum

rates, the fixing of which occupied so much time, would thus be rendered quite valueless. To this it might be replied that they have already been proved of very doubtful value. The attempted enforcement of the new maximum charges at the beginning of the year furnished sufficient evidence that a large proportion of them are quite impracticable, and was, indeed, the cause of the present inquiry. "Reasonableness," without any qualification, is suggested as the test of all railway charges, although it seems highly probable that this would entail further legislation. The Committee is also recommended to express an opinion in favour of the reconstruction of the Railway Commission being included in any legislative measure which may be introduced as the outcome of this inquiry, with a view to the more speedy and effectual settlement of rate disputes in the future. The solicitor for the Midland (Mr. Beale) contended that the companies were already prevented from making unreasonable charges, and that if an independent tribunal were established for fixing rates, it would have the effect of compelling the railway companies to restrict the facilities they at present offered to the public. This would be a matter for regret, but if it were done in a high-handed or wholesale fashion, no doubt the public would speedily take steps to find a remedy. Another suggestion is that on the application of either party to a dispute, the Board of Trade should have discretion to make an order substituting for the Railway Commission either an arbitrator or arbitrators. Sir Albert Rolit never loses an opportunity of endeavouring to extend the principles of conciliation and arbitration—as witness his address to the newly-formed West Ham Chamber of Commerce last Monday—and it is to be hoped that his praiseworthy persistence will meet with a large measure of success.


THE German Imperial Budget for the financial year 1894-95, which was put before the Reichstag on Monday, contains numerous items for structural purposes. The empire is expected to pay close on ninety million marks, or 4,500,000*l.*, for new buildings and civil engineering, of which sum practically 2,500,000*l.* will pass through the hands of architects, one million and a half through the hands of the civil engineers, and the rest will be disposed of by the railway engineers. The Imperial departments concerned in the expenditure are the Home Office, the War Office, the Admiralty, the Post, Telegraph, and Railway Administrations, and, as is only to be expected in this military country, proportionately the largest figures are for army purposes. The votes are, of course, to a great extent for payments on account, and hence this year's Budget can give but an idea of Germany's actual activity in building. Of monumental works alone there are in hand at present the new Houses of Parliament, costing 1,100,000*l.*, the new Imperial Law Courts, and the new National Monument, each estimated at 400,000*l.*

WE have so often pleaded for the prompt publication of monuments of Greek art, apart from and without waiting for their detailed discussion, that we are glad to know that M. Pottier, of the Louvre, has begun this work in connexion with what he calls the "Documents Céramiques," of the great Campana collection at that Museum. The collection, visited and examined as it constantly is by archaeologists from all parts of Europe, still contains unpublished material of great interest. This would scarcely be possible but for the fact that for the most part each vase or terracotta has to wait publication till it happens to fit in with or illustrate some theory of the archaeological inquirer. M. Pottier now undertakes the reverse method. In a series of papers beginning in the current number of the *Bulletin de Correspondance Hellénique*, he will proceed to make known all the

hitherto unpublished vases and fragments which possess any scientific or artistic interest, leaving detailed commentary to others as occasion may arise. Of the seven vases he illustrates we may call attention specially to a clyx of early style (fig. 6), of great importance in relation to the typology of later works. A banqueting scene is represented—five bearded men reclining on couches. One of them is served by an ordinary boy attendant. The other four—and this is the notable point—are provided with crowns and flower sprays by a siren and three winged Erotes. The vase is of interest in relation to the well-known "funeral banquet" scene. In the same number of the *Bulletin* M. Collignon publishes, with commentary, the archaic head (male, he thinks, not female) given recently to the British Museum by Mr. Robert Webb.

A SHORT paper by Mr. Richardson Evans was read at the Society of Arts on Wednesday evening on "The Regulation of Street Advertising," in the absence of its author, who was unfortunately prevented by illness from attending. The paper was an expression of the views of its author, and of the Society which he has been mainly instrumental in forming, in regard to the necessity of making some decisive stand against the constantly increasing defacement of our cities, and of London more especially, by the prevalence of advertising bills of great size and glaring design. The worst evil of the advertising mania, as the author of the paper would probably agree, consists in the intrusion of the advertiser into the midst of country scenery; but in this case the subject of the paper was intentionally confined to the defacement of cities. This subject we have already brought before our readers on more than one occasion. The most important point brought forward in the discussion which followed was the exceedingly practical suggestion of the chairman, Sir George Birdwood, in regard to the insanitary effect of the great expanses of paper and paste which are spread over every available surface in London in the pursuit of the bill-poster's trade. This side of the matter has not before been prominently mentioned as far as we have noticed, and those of us who are interested in the subject ought to be grateful to Sir George Birdwood for furnishing a new and important argument against the modern excess of advertising, and one which moreover may appeal to the minds of many who are blind to the importance of the subject considered on its merely æsthetic side. Some amusement was imparted to the discussion by the resolute and naïve defence of street advertising on the part of one or two speakers who were commercially interested in its continuance. We may take the opportunity of pointing out that Mr. Caine's Bill for the legal regulation of advertisements, now before Parliament, is not in any way promoted by the "Society for Checking the Abuses of Public Advertising," and is in some respects more drastic in its provisions than the Society would, on grounds of expediency, approve of. The Society in question has its own draft Bill in preparation, of which more will probably be heard in due time.

MR. WALTER CRANE'S lecture on the Use of Ornament at the Arts and Crafts Exhibition on Thursday evening was a particularly interesting one, and though many of the remarks made were expressive of opinions which Mr. Crane's charming book on "The Claims of Decorative Art" has made familiar, nevertheless the soundness of the opinions cannot be questioned, and their reiteration can only be welcomed. The lecturer accompanied his statement by charcoal sketches, which at once secured the interest of the audience which filled the room. A careful comparison of use and ornament led on to the assertion that these qualities should be inseparable; that the

saying "neither useful nor ornamental," which is too often with truth applied to manufactures of the present day, should lose its significance. The study of the history of ornament shows that its sources are usually of symbolic or constructive origin. The universal appearance of the key pattern  which appears in many countries, and from early times till as late a date as 1617, was commented on. The circle, as another universal symbol appearing alone and in conjunction with the former, representing the sun, and its rotation in various combinations. As regards the structural decoration, Mr. Crane explained by sketches many interesting developments of the spiral running pattern, whose origin was traced to the intertwining of the wattle construction; and the knotted and intertwined fringe of plaited mat forms gives rise also to a large tribe of patterns. Thongs and their use in fixing primitive axe-heads to the handles doubtless gave rise to further patterns, and to this is traced by some the zigzag of the Norman arch. The well-known influence of a wooden construction upon Greek architecture afforded other examples of the structural derivation of ornament. The working of metal with the spiral twists of wire and iron is a fruitful source of ornament. Mr. Crane emphasised the point that our designs should be English in the same view as the Persian designs were Persian. Their legibility should be as complete as in the days when books were few, and legends in architecture were read by the masses. Mr. Crane considered ornament as the constructive sense, dominated by a sense of beauty, and, as a distinct means of expression, it should have constructive basis in an architectural sense. A vote of thanks to Mr. Walter Crane for an entirely enjoyable lecture terminated the proceedings.

THE "Art for Schools Association" is holding a small exhibition at 29, Queen-square, Bloomsbury, of the class of work which it provides at a cheap rate for hanging in schools. These consist mainly of reproductions by photography, photogravure, and other processes, of high-class pictures, ancient and modern, as well as coloured pictures in a conventional decorative style, some of which have been noticed in our columns, and which are specially designed for chromolithography. The reproductions by this method of water-colour drawings not specially designed for the purpose are mostly very good, and indicate that the chromo-lithographs have been carefully selected, and that the Association is not likely to recommend or circulate the coarser forms of this rather doubtful process. The prices placed on the works seem very moderate, and the Association is doing well in showing to those interested in the artistic education of the people how examples of what is good in art can be brought before them at a small expenditure of money, if subject and method of producing are judiciously selected.

OUR attention has been called to an artificial sandstone, made in Germany, which is shortly to be introduced into the English market, we are informed, by Messrs. Peters, Bartsch, & Co., of Derby and London. This material is manufactured at Nieder Ingelheim, on the Rhine, in a rather peculiar manner, and may be briefly described as follows:—The sand employed is obtained from the locality and well dried and screened before being used; it contains from 2 to 3 per cent. of clay. When ready it is placed with a certain proportion of ground lime into an iron drum with diagonal ledges in the interior, which is then closed and slowly revolved by steam power, the materials thus being thoroughly incorporated with each other. The mixture is now taken out and conveyed to an apparatus consisting of a frame of wrought iron, having a

flat bed on which moulds are built up. We need not describe the method of making or arranging the moulds, but when the frame is built up it is filled with the mixture of sand and lime, not pressed in by force. Covers are then placed on, everything wedged up tightly, and the frame and moulds are run on rails into a cylinder. The latter is now closed, and water and steam admitted. The water must cover the moulds, and the steam is used at a pressure of about 45 lbs. to 60 lbs. per square inch. The steam forces the water between the crevices of the moulds, the water slakes the lime, causing it to expand in volume, and as the moulds resist the outward expansion, the lime is forced into the sand and cements it into hard stone. The steam pressure is kept up for three days, after which the frame is withdrawn, and twelve hours allowed for cooling before the moulds are taken to pieces, and the stone removed. If stones of different tints are required, the effect is obtained by the use of coloured earth, a small percentage of which is mixed with the sand and lime in the revolving cylinder previously referred to. We have before us the results of some experiments made in England to ascertain the resistance to thrusting stress of six 6-in. cubes of this artificial sandstone, from which it appears that, on an average, three of them, of buff colour, crushed at 1966 tons per square foot, whilst the remaining three, which were grey, went at 1776 tons per square foot. These results are compared, though we cannot conceive why, with Monk's Park Bath stone. The two materials have nothing in common, one being, as we know, an artificial sandstone, and the other a shelly oolitic limestone; they are in no wise comparable in the sense implied. If one showed double the "crushing strength" of the other that would be no criterion as to which was the better material. It would be much more satisfactory to compare the results with natural sandstones, or, better still, with other artificial sandstones. However, this new German stone appears to be immeasurably superior to some others of its kind that have come under our notice. It is compact, and is not unpleasant to the eye; it has the aspect of some of the lighter natural sandstones, though in composition it is, of course, very different, except that both contain a large percentage of quartzose sand. On testing a sample weighing 338 grains we found that it absorbed 36 grains weight of water in three hours—not an excessive amount. We understand that works will shortly be established in London, and the stone made entirely from materials found in this country.

THE Standard Electrical Time Recording Company is now showing its system at the company's offices in Westminster. An ordinary pendulum clock is used as the standard or regulator, but instead of the mainspring being wound up in the usual way it is wound up every half minute by a current from two Leclanché cells, which lasts for about one-eighth of a second. The periodic current which winds the regulator can be sent through receivers placed in the various rooms of a building. The receivers look like ordinary clocks, but instead of clockwork an electro-magnetic arrangement is put in the cases which advances the hands by a half minute every time the current passes. It is found advisable to reinforce the current by adding one cell to the battery for each receiver. The current becomes weaker as the cells run down, so, to prevent them being exhausted without due warning, an ingenious "tell-tale" has been devised. Two discs are adjusted to move round equally by ordinary ratchet gear every time the current passes. But to one is attached a stronger spring than the other; when, therefore, the current falls off, its electro-magnet cannot extend the stronger spring to its full extent, and the one disc moves slower than the other. One disc is perforated by

two holes, the second, which is placed behind the first one on the same axis, has two red spots painted on it; ordinarily these are hidden, but when the speeds become unequal the spots appear at the holes and thus give the alarm. There are other automatic arrangements used in connexion with the system, among which is an apparatus which can be set to advance or retard the clocks on a ship when travelling east or west. It is estimated that the regulator costs 2s., and each recorder 1s. per annum for battery power, so that the upkeep can be but small.

THE appointment of the Surrey County Surveyor does not seem a creditable business. The Surrey County Council advertised for a Surveyor, who was to have a salary of 800*l.* a year and travelling expenses, and of course got a very good list of candidates, from whom they selected four, viz.: Mr. A. T. Davis, Shropshire County Surveyor; Mr. de Courcy Meade, the well-known Surveyor to the Hornsey Local Board; Mr. O. J. Sheldon, Essex County Surveyor; and Mr. F. G. Howell, the son of the retiring Surveyor. A member of the Council protested strongly against the inclusion of the last-named candidate among the selected four, on the ground that he was not in any way their equal, and that if the election was to be based on merit, he could not understand how his name came to be coupled with that of Mr. de Courcy Meade. The four names were put, however, and the first voting gave a majority for Mr. Howell, Mr. de Courcy Meade coming next. On these two names being put up for a second voting, the numbers were equal, whereupon the chairman gave the casting vote for Mr. Howell. Now, Mr. Howell may have merits that we do not know of, but Mr. de Courcy Meade has merits that everyone knows of, and was, in fact, a very exceptional candidate. In persisting in such a case, in electing the son of their retiring Surveyor, the Council can hardly have had the interests of the ratepayers uppermost in their minds, and moreover, in advertising the appointment at all, they have done little better than make fools of the candidates, as it must be pretty obvious that they intended to elect Mr. Howell all along.

WE have often commented on the absurdly realistic ideas which prevail in England in regard to the treatment of what is supposed to be artistic silversmiths' work. A cruet-stand which has been designed by a Councillor of the new "seaport" of Salford, in honour of the Manchester Ship Canal, and has been executed by Messrs. Elkington, is an amusing example of its class. An artist might find a fine subject for treatment in that; figures emblematic of sea and land, of commerce and shipping, &c. But the English commercial mind takes a more practical view of such matters. The cruet-stand in question is oval in plan. A representation of the Canal, in sheeny surface to represent water, enters at one end and winds about three-fourths of the way round the base; on its bosom rest two silverships, miniature models, it is understood, of two which will eventually ply on the Canal. Lift off the decks of the vessels, and lo! their holds are filled with salt, and two navies' spades serve for spoons. At one end of the stand is a lighthouse, which forms the mustard-pot; floating in the Canal at the other end of the stand is a buoy (nearly as big as the ships); this is the pepper-pot. Stretching from the lighthouse is a tongue of land, in which appear the Salford docks. These (unlike the buoy) are of Liliputian dimensions; by no possibility could either of the salt-ships enter them. In the centre is a Brobdingnagian anchor stuck on to serve as a handle. This precious *olla podrida* of absurdities is, we understand, registered as a design! The unfortunate inventor of it has probably not the slightest suspicion that

he has provided a laughing-stock for artists, and that "design" means the production of something which will have decorative effect, not the jumble of imitations of artificial objects without regard even to scale, consistency, or relation to the uses to which they are to be put.

LETTER FROM PARIS.

As has been already recorded in our columns, the General Committee for the Exhibition of 1900 has ratified the report of M. Picard's Sub-Committee recommending that the site chosen should be the same as that of the 1889 Exhibition, with the addition of a portion of the Champs Elysées, and the quays between the Pont d'Iena and the Pont de la Concorde. It is of no use to dwell now on the criticisms adverse to the scheme, which have had no effect, but which we still hold to have been well founded. In the words of Boileau

"Un diner rechautté ne vaut jamais rien,"

and it is the same with an "Exposition Universelle." The public wants to see something new. It is apparently the intention to leave competitors for the plan and buildings of the Exhibition free to choose whether or not they will include the existing buildings of the Champs de Mars in their schemes. This is another mistake, for the first condition for giving the Exhibition, under the circumstances, an aspect of novelty, would be the complete clearing away of the structures of 1889, excepting the Eiffel Tower, in regard to which, unfortunately, the State has tied its hands for twenty years. As the jury for the competition will include the architects of the principal structures of the 1889 Exhibition, it is to be feared that their natural partiality for their own works will incline them to favour the schemes which will leave these intact, and in such a case the future Exhibition will hardly be worthy of the close of the century or of the artistic fame of Paris.

The General Committee is also occupied with the question of transport. Everyone will remember the difficulties which the visitors to the last Exhibition experienced in getting to the Champ de Mars, and still more in getting back from it; difficulties which certainly reduced the number of entries. As it is to be supposed that the numbers of 1900 will be still more numerous, it is important to obviate any recurrence of this drawback; and if the continually-promised metropolitan railway is not provided by 1900, it will be requisite to prolong certain lines of railway further into the centre of Paris, and thus to develop the existing incomplete means of locomotion.

Some progress is being made in this respect on the left bank, where the works for the prolongation of the Sceaux railway are being pushed forward vigorously. While the subterranean road is in process of formation, the terminus at the angle of the Boulevard St. Michel and Rue Gay Lussac is being prepared by the transformation of an existing mansion in flats into booking-offices and "salles d'attente." In the cellars of this building the approaches to the railway will be formed, with the offices on the ground-floor, while the upper floors will still remain as private dwellings. This arrangement, which is a rather startling innovation on Parisian habits of living, has obliged the Orleans Railway Company to take special precautions to secure good ventilation of the lower stories by extract tubes, which will be masked as kiosques. A powerful ventilating fan placed in the basement will draw both the contaminated air, and expel it through a high chimney. The stations of Boulevard Port Royal and Place Denfert-Rochereau are also in process of construction. The first will be a light construction forming a shelter to the arrival and departure staircases, and giving access to a foot-bridge on which the booking-offices will be formed. Here the work proceeds without opposition, but this is by no means the case with the projected station at the Invalides, to which strong objections are being raised. The "Comité des Monuments Parisiens" has opened fire. Next came the "Société Centrale des Architectes," which has published a protest signed by M. Daumet. The "Association Amicale des Architectes Diplômés" has addressed a similar protest to the Minister of Public Instruction. So the matter rests at present. It remains to be seen whether æsthetic considerations will gain the day.

It is nearly a year since the committee for the decoration of the Hôtel de Ville has held a meeting. It was considered advisable to leave the artists a little breathing-time, in the hope of their accomplishing something really important.

Last week the committee was able to form a judgment on the progress of the work undertaken by M. Jean Paul Laurens in the Salon Lobau, and that of MM. Picard and Risler in the gallery next to the Salle des Fêtes. The third panel executed by M. Laurens, representing "Louis le Gros donnait aux Parisiens leur première charte," has been much appreciated; it is clear and harmonious in colour, with a great deal of life and spirit. It shows a kneeling crowd around the royal throne, which is surrounded by grim-visaged nobles and austere ecclesiastics. It is a great improvement on the two preceding works, "Etienné Marcel protégeant le Dauphin" and "Louis XVI. à l'Hôtel de Ville"; and one reason for this may be found in the fact that in this case, after the first studies were made, the artist painted the picture directly on the wall, under the actual conditions of light to which it was to be permanently exposed, and not in the artificial light of the studio. MM. Picard and Risler, whose work includes fifteen cupolas and two hemispherical niches, have already executed—also directly on the wall—five cupolas, adorned with very pretty figures of women and children playing in a kind of dream landscape amid spring flowers. The committee has been exceedingly well satisfied with the work of these young artists, who have succeeded in imparting to allegorical painting a new and essentially modern spirit. It is to be hoped the Committee will be equally fortunate in its further selection of artists. Besides the work already commissioned, place has been found for M. Chéret, the decorative artist, and M. Forain, the caricaturist. The first is to make the cartoons for the tapestries for a small drawing-room, to be carried out not at the Gobelins, but at a private manufactory. M. Forain, whom one never expected to see engaged on the official decoration of a palace, is to paint the walls of the refreshment-room of the Municipal Council. If this school of art is to be introduced, why not go further, and give M. Willette a turn? The competition system, which produced no good result except in the case of MM. Picard and Risler, is now at a discount, and the Council, who at first would have nothing but competition, now evidently prefers giving direct commissions, and this course will probably be taken in regard to the decoration of the Council Library, and that of the "Grande Salle de Budget." For this latter there is talk of employing mosaic, or else wood-inlay combined with ceramic decoration, a combination which has not yet found place in any portion of the Hôtel de Ville decoration.

At the Mairie of the IV^e Arrondissement the large decorative design undertaken nine years ago, as the result of a competition, by M. Léon Comerre, has been lately completed and fixed. The work, which has cost 50,000 francs, consists of fourteen allegorical subjects in panels. The last of the series symbolises "L'Etude des Lettres et Sciences."

The "Union Centrale des Arts Décoratifs" has just given judgment on a rather interesting competition in electric light burners, &c., goldsmiths' work, and artistic binding. Industrial art is taking a more and more important place at Paris. The Municipal Council occupies itself much with this subject, and intends to organise at the Musée Galliera, a complete museum of art applied to industry. M. Carabin has just executed the model for a case of very original design for the central hall of this Museum, which will in itself be an interesting specimen of wood-carving, with caryatid figures and finely-decorated panels. We have also seen the studies for some curious bindings ordered for this Museum, from MM. Prouvé & Wiener, and some stoneware by M. Delcherche, which is also destined for it, and reliefs in pewter by M. Desbois. In fact the Musée Galliera seems likely to become a serious rival to the Musée des Arts Décoratifs, which rather suffers from the want of a definite aim and intelligent direction.

The season of small exhibitions has commenced. At the Georges Petit Gallery is the "International" exhibition of painting and sculpture, among which the most noteworthy works are those of MM. Dagnaux, Boucher, Lautens, Drouseaux, Carrier-Belleuse, &c. At M. Durand Ruel's gallery M. Ganguin, after a long absence from Paris, is exhibiting a series of studies at Tahiti which are clever and interesting. M. James Milliet, the landscape and animal painter, exhibits at 18, Rue Louis le Grand, a small collection of pictures of considerable merit.

The Cluny Museum has come into possession of a curious carved ivory triptych of the fifteenth century. It belonged to a provincial church in a dilapidated condition, which gave it up to the

State in return for work of reparation to the church. Japanese art has made its official entry into the Louvre, where a room has been opened specially devoted to Japanese work—watercolour drawings, pottery, sword-hills, &c.

It is announced that the Panthéon decoration commenced by the late Elie Delaunay is to be taken up and completed by his favourite pupil, Georges Desvallières. The work consists of a series of paintings illustrating the history of Ste. GENEVIÈVE, the patron saint of Paris.

A statue of Condorcet, by M. Georges Perrin, is soon to be added to the list of public statues of Paris. It is to be set up on the Quai Conti, between the Hôtel des Monnaies and the Bibliothèque Mazarine. On the other side of the Seine is the Raffet Monument recently inaugurated, the white profile of which now stands out in front of the Louvre. At the foot of a marble column supporting a bust of Raffet, is attached a trophy of arms and flags and the Imperial eagle. At the left of the column a drummer of Voltigeurs of the First Empire beats the charge furiously; the figure reminds one of the drummer in Raffet's celebrated composition—

"Le grand revue qu'à l'heure de minuit

Passé, aux Champs Elysées, César décadé."

This figure is very fine, and happily breaks the otherwise rather too meagre lines of the monument.

The death of M. Charles Gustave Huillard, Honorary Architect to the City of Paris, has already been recorded in our "Foreign" news column. He was an experienced and conscientious artist, who had taken part for many years in the public works of Paris. The restoration of the Tour des Ducs de Bourgogne was the principal object of his attention during recent years; a design for this, which he made, received a medal in the Exhibition of 1878. Economic considerations, and the absolute indifference of the Municipal Council, prevented the realisation of this scheme, and perhaps in part the opposition of M. Alphand, who, with all his administrative faculties, as an engineer had little love for architects, especially for those who showed any independence of opinion or action. There is no doubt that the failure to see this scheme realised was a subject of great vexation to the late architect. M. Huillard carried out the construction of the group of school buildings in the Rue aux Ours, the side portal of the Église St. Roch, and the new Salle des Mariages at the Mairie of II^e Arrondissement. It may be added that Huillard, who died at the age of 69, had been one of the ablest pupils of Ballard. He obtained a third medal at the Universal Exhibition of 1878, a bronze medal at that of 1889, and the Cross of the Legion of Honour in 1892, on his superannuation retirement from service.

ON VARIOUS TYPES OF FOUNTAINS.

It is not strange that in ancient times, all through the Middle Ages, and even down to our own day, fountains and springs have been regarded with a feeling akin to veneration. The pure water gushing out from the rock, or rising up from the soil, instinctively appeals to the mind as a direct gift from the Almighty uncontaminated by the hand of man, and its refreshing and cleansing attributes give us such an extraordinary emblem of purity and repentance, that it is in no way astonishing to find temples, churches, shrines, and other religious structures erected either over or in their immediate proximity.

The scriptural term "a fountain of living water," supplies us with another emblem, that of life, and there is, perhaps, scarcely a great poet who has not used this figure or symbol. In the earliest times, no doubt, the word "fountain" meant simply a natural spring, but later on it was used to denote the basin in which the water from the spring was collected, and from this it became by degrees to be rather dissociated from its original meaning, and confined almost to suggesting a mechanical contrivance which squirts out water into a basin or series of basins.

Fountains would seem in early times to have consisted of an aperture in a wall, which squirted the water into a basin or pond; but later on these apertures were placed in a centre column or spiral structure. Of course, in the former case, the water flows down from its own level through the aperture into the basin; in the latter, the water has to ascend to the various apertures and then again descend through them, which is done by the fountain being fed by water at a higher level, or forced into the column by some mechanical means—hydraulic pressure, for in-



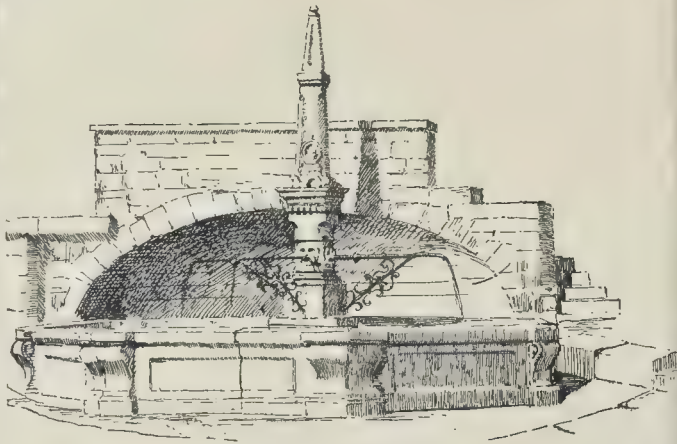
In the Fild-marke, Ratibon.



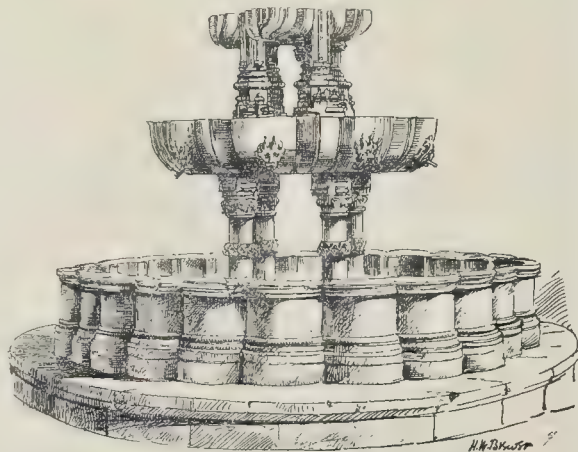
St. Jean de Doigt, Brittany.

stance. It seems impossible to suppose, as some scientific writers have maintained, that the ancients and Medieval men, who were so skilful in the arrangements of their fountains, were unacquainted with the fact that water will find its own level; and the proof advanced that they erected aqueducts, where such works could have been dispensed with, is insufficient and unconvincing, because there are many advantages possessed by aqueducts over underground pipes, which need not be discussed here. As I have already pointed out, two ideas of the arrangements of fountains were common in ancient times, and all departures from these two ideas are more or less unsatisfactory. The more complicated kind of fountain, it appears, should always consist of a large basin or pond, and a spine or column, which squirts out the water and supports the smaller basins; sometimes a canopy covers the whole structure, an arrangement which has its advantages in the streets of towns, where it is advisable to protect the water from gusts of wind, which would otherwise prevent the streams falling into their proper basins, and blow them out on to the pavement, creating puddles and muddy swamps, such as may be seen on any windy day in Trafalgar-square. Two fine examples of canopied fountains of almost contemporary date are to be seen in the market of the Innocents at Paris, and the great court of Trinity College, Cambridge. The former is a work of the celebrated Jean Goujon, and the latter probably by Ralph Simons. The French fountain is crowned by an oblong canopy adorned with pediments and pilasters; but the English example has an octagonal canopy, supported on columns. In general effect and outline it is quite equal to its French rival, but no comparison whatever can be instituted between the sculpture and the workmanship of the two, because, like most English works carried out at the close of the sixteenth century, the sculpture of the Cambridge fountain is coarse and barbarous; whereas the water-nymphs filling in the panels of Jean Goujon's fountain are amongst the noblest works ever produced by the sculptor's art of any age.

It will be noticed that in nearly all the examples which we illustrate the spine or column is very slight and delicate; it is true that in the Batalha example, owing to the great size of the upper basins, a considerable amount of support was necessary, but in order to obtain this instead of converting the spine into a cumbersome mass of masonry, it is made to consist of four columns below and four pinnacles above. It is very unfortunate that this splendid work, which stands in the cloisters of the famous Portuguese monastery, has either never been completed or its top feature has been destroyed. Probably these four pinnacles, the bases of which alone exist, supported a small canopy. The design of the



At Eszlingen.

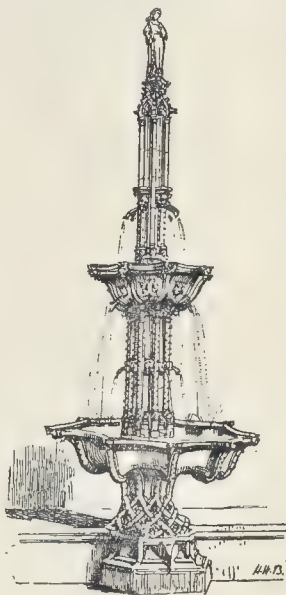


In the Cloister, Batalha, Portugal.



Trinity College, Cambridge.

architecture, in fact, the support must be in proportion to the work it has to do. There is no doubt that fountains like the Pauline at Rome, where the water rushes out in great volumes, are very striking, but it may be questioned whether works of this kind are not rather to be regarded as artificial cataracts than fountains, like the



In the Cathedral, Freiburg in Brisgau.

It bears some resemblance to the famous fountain of Perugia, and also to the Moorish one of the Alhambra.

To show how very delicately the spines of fountains were treated both in Gothic and Renaissance, look at the examples from the Cathedral of Freiburg in Brisgau, and that the churchyard of St. Jean de Doigt, in Italy. The former stands at the back of the altar, and is most probably the work of

has the great advantage that it prevents the water dribbling down and staining the stone-work. Considerable similarity will be noticed between the treatment of this fountain and that copied from a singular illustration of the Garden of Eden in the "Der Schatzbehälter," a work published in the year 1491, illustrated with coloured engravings by Wohlgemuth, a copy of which is in the possession of the writer. The great difference between this and the Freiburg fountain is that it has only one basin, from which the water is discharged on to the ground, but this is done because it is intended to represent the spring which fed the four rivers which watered Paradise, which are called in "The Vulgate," Phison, Gehon, Tigris, and Euphrates; in the English Bible the second river is called Gihon and the third Hiddekel.

The fountain at St. Jean de Doigt is chiefly composed of lead; it is a very elegant structure, exactly following the Medieval plan.

The little fountain at Zell, near Würzburg, and that in the fish market at Ratisbon, are very pretty examples of the spine being placed at one side and not in the centre; they have no basins, but only the pond. I very much regret to say that the charming metal grill which surrounded the Ratisbon fountain has been removed since I made my sketch, but the destruction of old fountains which has recently taken place in Germany has been so mischievous in its results that in a few years it is doubtful whether any will be left. Some years back I saw a fountain at Würzburg that had been immortalised by Prout, pulled down, and replaced by a cast-iron pump, designed in what the Germans called the "Byzantine style."

The fountain at Eszlingen is of a very common form, but has the peculiarity about it, that a lane, leading to an upper part of the town, is carried across it, and this difficulty has led to a very pretty arrangement. Of this class of fountain, very charming examples are to be seen in the market places of Ratisbon, Hildesheim, &c.

In Late Renaissance or rococo fountains the idea of the thin spine is more or less departed from, but I venture to think the result is less satisfactory than where the earlier treatment is followed. Of course, to a certain extent the size of the spinal column must be in proportion to the flow of water to be ejected; in all good

works at St. Cloud, Chatsworth, &c. I cannot help thinking, however, that there is something very unsatisfactory in constructions of this kind, unless the water supply is constant and sufficient. To see a vast fountain or artificial cataract which only "plays" for about half an hour during the day, and for the other twenty-three and a half hours is a series of wretched puddles or a miserable dribble, is employing enormous



Zell, near Würzburg.

means to achieve a most unsatisfactory result; but this is far too often the case in our modern fountains. Of course, it may be that a fountain has to assume a monumental character, and must be an important structure, but it does not from this fact follow that it should be arranged for an enormous supply of water which is rarely, if ever, forthcoming. One of the largest and most important Medieval fountains, the famous Schöne Brunnen at Nuremberg, by Ulman Stromer, 1385-1396, is treated as a kind of memorial cross with a fountain, the fountain portion being quite a secondary business, yet the



"Schatzbehälter" (1491).

Meisenberger, of Gratz, who erected the of the church between the years 1471 and 1472, it is of red sandstone. As it is inside the church, its designer had not to take into consideration any troubles arising from the weather, &c., so that he has kept his basin smaller than usual, and the spine exceedingly delicate. The flow of water is small, and in order to make the most of it, the heads which squirt the water have metal-pipes inserted into their mouths, a treatment which is very common in Medieval examples, and one which

result is perfectly satisfactory. It may, in fact, be regarded as an example of the canopied fountain to which I have alluded.

I now come to a very important point in the design of a fountain, and that is the application of sculpture. I think one may lay down this rule: "The sculpture must be applied to the fountain, and not the fountain to the sculpture." I firmly believe that nine-tenths of the failures in the design of modern fountains arises from the neglect of this rule. We very often find a group of sculpture which is very good in itself, forming the ornamental portion of a fountain with which it seems to have no kind of connexion. The fact is, a fountain must possess an architectural treatment to start with, to which the sculpture must be properly applied; I do not mean to say that the architecture and the sculpture cannot be the work of the same individual; it is, perhaps, better that it should be so, provided the person in question is sufficiently acquainted with both arts; but, if not, it is certainly better to have two men at work—one who understands architecture and the other sculpture—rather than to have good sculpture united to bad architecture and *vice-versa*. In the earlier fountains, sculpture is nearly always applied to the spine and the jets; in the former case, it frequently consists of statues, animals, and decorative carving; in the latter, it is generally heads of men or beasts. At first thought, the notion of a head vomiting out water does not seem a nice idea; one has, however, become reconciled to it, on account of its antiquity and the difficulty of replacing it by any satisfactory treatment; those adopted in a well-known fountain at Brussels, and one at Nuremberg, are simply repulsive.

In the wall of a rock-cut church at Schwabisch Gmünd is a fountain adorned with a representation of Moses "striking the rock," which is suitable to its position; and on the side of the doorway of a church near Würzburg is represented a little temple with this inscription:—

"VIDI AQUAM EGREDIENTEM DE TEMPIO A LATERE DEXTRO, ET OMNES AD QUOS PERVENIT AQUA ISTA SALVI FACTI SUNT."

These are appropriate to their situation, but would not be suitable elsewhere. The plan of treating the jets as flowers or groups of foliage has sometimes a pretty effect, where the flow of water is small, but cannot be used where it is large. In many of the large rococo fountains, Tritons, fish, shells, and rocks squirt out the water, and sometimes it is made to flow over the basins from invisible apertures; a plan probably adopted from the old "sweating fountains" of antiquity, such as the "Meta Sudens" at Rome.

Sometimes these arrangements are effective, but are never so unless the supply of water is constant and amply sufficient. Certainly the effect of the three great fountains in the Maximilian Strasse at Augsburg, the work of Hubert Gerhard, 1590, Adrian de Vreïs, 1599, is very striking, probably owing to the fact that the supply of water is very plentiful, but when the same kind of treatment is exaggerated and the water supply insufficient the effect is wretched. Yet how often do we see one of these vast heaps of stone carved into the semblance of Tritons, river-gods, rocks and shells with a miserable little dribble of water meandering down the dirty faces of the river-gods, trickling from the noses of the dolphins, and eventually finding its way into some huge shell basin, where, if it is in a town, mixing with dirt, dust, bits of orange-peel and torn paper, it forms a horrible kind of stew, nauseous and repulsive alike to sight and smell, whereas if it is in the country the basins not receiving their proper supply of water get half choked with dead leaves, straw and mud, out of which grow slimy mosses, rank weeds, slugs and other undesirable creatures. Surely nothing is more depressing than such an object?

It is, of course, quite possible to design a fountain which is not look well and be ornamental, even when it is not working; but these great fountains intended for an enormous flow of water which is unattainable are ghastly objects.

Many Renaissance fountains have no sculpture about them, and depend entirely for their architectural effect upon the elegant contour of their basins. These nearly always look well, and are far better than works overloaded with bad sculpture and inferior carving. In fact, in designing a fountain the end and object of the structure should never be lost sight of, and nothing should be attempted where the means are inadequate. The Renaissance and Mediaeval designers show how a small supply of water may be economised and yet a thoroughly satisfactory effect be obtained. They also show us how with little or no sculpture, but by simply studying elegance of form, a

graceful fountain may be designed; whereas the rococo and late Renaissance structures caution us against the absurdity of overloading such erections with sculpture or ornamentation, and depending for effect upon a vast supply of water, which is either only attainable at rare intervals or never forthcoming at all. H. W. B.

THE ARCHITECTURAL ASSOCIATION.

HARD WOOD JOINERY.

THE third meeting for the present session of this Association was held on the 24th ult. in the Meeting Room of the Royal Institute of British Architects, No. 9, Conduit-street, Regent-street, the President, Mr. E. W. Mountford, in the chair.

The minutes of the previous meeting having been read and confirmed, the following gentlemen were elected members of the Association:—Messrs. F. G. Adcock, A. F. Allen, J. T. Bennett, P. A. Boulting, C. H. Bressey, A. MacDonald Brown, R. D. Collard, Allen George, F. L. Head, S. A. Heward, E. M. Hockings, G. E. Holditch, E. J. Mager, A. E. Nightingale, F. Oliveri, J. H. A. Phillips, E. J. Pullar, C. A. Ridsdale, H. S. Sage, H. A. Smale, L. Simmons, C. Wontner Smith, A. Stevens, D. Sturt, B. Walker, R. M. Whellock.

The President said that they would doubtless have noticed that the list of new members did not include the names of the two ladies whom he had the pleasure of proposing at the last meeting. Their names had been withdrawn at their own request because they heard that there was going to be a certain degree of opposition to their election that night. The Committee had decided to call a special general meeting for December 15, to consider the general question of the advisability of taking ladies as members of the Association, and the following resolution would be moved:—"That in the opinion of this meeting it is expedient that ladies engaged in the study or practice of architecture shall be eligible for election on the same terms and under the same conditions as men." He ought to say that the Committee did this not from any feeling or fear that the by-laws did forbid the election of ladies. So far from that being the case they had the authority of those who drew up the by-laws to say that when they were drawing them up with the aid of counsel, the counsel asked them especially if they wished to forbid the election of ladies, and he told them that if they did wish to prevent the election of ladies they must add something to the by-laws, because at present there was nothing to prevent it. That did away with one objection he had heard. The others were hardly worth considering, he thought. He had spoken to a great many of the leading members of the Association, and he thought that all agreed with him that the election of ladies was most desirable from all points of view.

Hard Wood Joinery.

Mr. H. W. Barnes then read the following paper on "Hard Wood Joinery."

Probably modern hard wood joinery would have been a better title for the present paper, as at the request of your President, it deals more especially with this branch of the subject, Mediaeval work only being referred to incidentally; cabinet-making, intarsia, &c., are also outside its scope, as they are really distinct trades.

Hard wood joinery may be considered from various points of view, from the elaborate vaulted canopies of a cathedral worked almost entirely by hand, to the simplest domestic fitting, now produced to a very great extent by machinery, but each giving scope, in a greater or lesser degree, for the skill of the workman.

For its production, if the work is to be really good, two things are absolutely essential—good workmen and good, well-seasoned wood, for it is as impossible for a good workman to produce satisfactory work with bad material, as it is for an inferior workman to turn out creditable work, however good the material may be.

A short review of some of the hard woods more generally used may therefore be of interest at the outset.

Oak seems naturally to take precedence, and of this there are several varieties—English, Russian, Hungarian, and American being the principal; of these English still stands unrivalled for strength and durability under exposure, but it has been superseded to a very great extent for internal fittings by the others, which are easier to work, and from their milder nature less liable to twist or crack; English oak trees are usually felled early in the year, when the sap has risen, on account of

the value of the bark, which is then easily stripped off and used for tanning leather, but oak so felled takes about two years longer to season than that felled in the winter; in the latter case, however, the bark cannot be stripped off, and is therefore wasted. English oak trees at times produce planks of great width; one cut down some years ago at the scene of your last summer excursion (Diss), yielding perfect ones 5 ft. wide.

Undoubtedly the finest oak available of late years for interior work has been the variety known as Riga wainscot, the grain being very fine, close, and regular, the wood a good colour and easy to work. But the logs, never very large, are now smaller than ever; in fact, it is very difficult to get them at all, the supply being nearly exhausted. Several other kinds are also shipped from Russian ports; these are principally cut from small trees, the grain is coarse, and, as a rule, they are unsuitable for good work.

Hungary produces a very fine variety of oak. The logs are much larger than any formerly shipped from Riga, and at the present time this is certainly the best oak available in any quantity, its great width making it specially valuable for panels. This is shipped at Fiume, in the Adriatic. It should be remembered, however, that Hungary, as well as Russia, also produces some very inferior sorts.

America sends large quantities of oak to this country, but it is not equal either to Riga or the best Hungarian. The grain is very open, the colour poor, usually with a pink tint, and generally speaking, is unsatisfactory for high-class work.

The silver grain is a distinguishing feature of oak, and produces the figure; the radiating line of this can be seen in any section; these lines are absent in chestnut, and in many cases form, probably, the only way of distinguishing the two woods; if the various samples of oak before you are compared with that of chestnut, this will be at once apparent.

One other point respecting oak is worth referring to—the term wainscot. This does not distinguish any particular variety or locality, but applied indiscriminately to all logs cut on the quarter.

Mahogany next claims attention, the different kinds varying considerably, that known as Spanish coming from San Domingo, being the most valued. In the past this has been extensively used, but is now very scarce, its place being taken by another Spanish variety, found at Cuba, which is very close-grained, hard, and of good colour, but the kinds more generally used at the present time are obtained from Tobasco and Brazil. Honduras, Panama and Africa also send mahogany to this country, but the quality of both is very poor.

Of walnut, five descriptions deserve notice. Italian coming first, both for closeness of grain and beauty of markings. This is difficult to obtain at the present time, but a variety much resembling it is now imported from Circassia. English lighter in colour and not so richly marked, totally different kind, known as black walnut, shipped at Quebec; it is much softer than the others and almost devoid of markings, but can be obtained in large sizes and is not likely to crack. A lighter shade of the same wood is shipped from New York and other United States ports.

Teak is imported from Burmah, and is especially valuable for work exposed to the action of sea air and salt water; it is also coming into general use for hospital floors; a variety is found at Bangkok, but the colour is not so good.

Many devices have been tried for artificially drying hard woods in a short time, but all open to objection of some kind or other, allowing the wood to season by the natural action of the air on the boards and planks is after the most satisfactory, although, of course, it is a long process.

But it is time to pass from the material, to various methods of working it.

Starting at the beginning; the selection of wood before it is cut to size is more important than appears at first sight, for on this much of final appearance will depend, and too much cannot be exercised at this stage, for carelessness in matching will prevent the work ever looking really well, and most likely result in considerable waste.

Cutting to length and width is now done entirely by steam saws, afterwards the wood passed through a trying-up machine, which planes it to thickness and width, leaving it quite straight and ready for moulding; morticing and tenoning are also done by machinery and absolute accuracy secured; so far machinery is of advantage in every way, and, in addition, it also relieves

oiner of the very hard labour necessary before its introduction, leaving him free to devote all his energies to the remaining parts of the work, in which a good workman will find plenty of opportunity to display his skill.

Up to this point the preparation of all hard wood joinery is practically the same (nor does it differ materially from soft wood work), but as in its further stages the methods diverge considerably, it will be well to consider these under two broad heads; first, the simpler forms, in which machinery continues to play an important part, and afterwards the more elaborate work, which has frequently to be done almost entirely by hand.

Formerly mouldings were worked either by planes of various shapes or by routers; the latter were of steel, much the same as modern machine irons, but let into a piece of wood and worked backwards and forwards by hand—a long and tedious process.

The introduction of machinery has, however, one way with both these methods, so far as the ordinary mouldings used for domestic fittings are concerned; in such work the mouldings can and should be turned out in such a manner as not to need touching by hand, and when cost is of great importance, care should be taken that the sections be such as can be worked by passing once only through the machine.

Before further considering the question of sections, and the important bearing they have, both on the appearance and cost of work, it may be of advantage to call attention to the practice allowed of cutting boards and planks to the nominal thicknesses of 1 in., 1½ in., and 2 in., on but as the saw-cut and planing have to be taken out of this, they never hold the full thickness when worked up, 1 in. finishing ¾ in., 1½ in., 1½ in., 1½ in.; therefore (paradoxical though it may seem), it costs more to produce work 1½ in. thick than 1½ in., for 1½ in. boards just used in each case, but there will be increased labour in reducing them to 1½ in.; planks also finish about ¼ in. less, and wide English oak ones sometimes even ½ in. less, as, on account of the greater strength of their grain, the latter are more liable to twist in drying; by heaping this in mind unnecessary waste may frequently be avoided.

It should also be remembered that cornices, gippings, and similar mouldings will stand infinitely better if built up, and be far less likely to twist or crack, than if made solid, the result being better work at less cost; care must, however, be taken that each part is properly squared or cross tongued; there are several sections of actual work on the table which will show the system fully; attention is specially called to many of these sections, and particularly the ebony frame, which show what effective buildings can be obtained from thin material.

Construction, in fact, deserves more than a passing notice, for on it very much depends, and very detail should be carefully thought out. It is difficult to lay down any hard-and-fast rule on the subject, as each work should be considered on its merits, but mortices and tenons are always safe and reliable; in the case of very thick doors, however, it is sometimes desirable to put these double rather than single, to avoid any possible warping of the styles; where, however, mortices and tenons must be employed, handrail screws may frequently be used with advantage; dovetails are not very good, but apply more especially to shelves and cabinet making; wall panellings, doors, and skirting should always be tongued together at the angles and into the floor, otherwise dust will find its way between and underneath them, possibly forming a harbour for the germs of infectious disease. Flooring should be laid in row widths and tongued at the joints.

Large columns will never stand if made solid; it will crack and twist out of all shape; if, however, they are made in sections, the difficulty is entirely avoided, the result being very much stronger work, at no increase of cost, but rather the reverse.

When great strength is required, such as an iron timber roof, solid wood must, of course, be used.

The various systems of mitreing next claim attention; in cheap joinery the work is framed up bare, and the mouldings mitred in afterwards at the top of the panels; but this method is open to serious objection, the stability of the mouldings depending entirely on nails driven in at an upward angle, and if these chance to go through the panels instead of into the styles and rails, the panels shrink, the result will be an unsightly crack; except in the case of telection mouldings, which can be rebated on to the styles, &c., and

properly fastened, this treatment should never be adopted for good work.

An infinitely better system, and the one usually employed in high-class joinery, is to work the mouldings on the solid of the styles, rails, &c., cutting out the styles to receive the rails, and so forming a mitre.

A third method, applied more especially to ecclesiastical joinery, will be referred to later on.

When the work is ready for framing up, it is most desirable to put it together, and let it stand as long as possible, before actually glueing and wedging, as no matter how dry the wood may be, it is sure to shrink when first worked; in fact, there are well authenticated instances of this occurring when re-working old beams which have been in position for 200 or 300 years.

Framing up and cleaning off afterwards are two very important matters; shoulders, which in soft woods need hardly be touched after leaving the machine, must, in hard woods, be gone over carefully by hand, otherwise good results cannot be obtained. Mitres, too, demand very special attention; for all such work the tools differ very materially from those used for soft woods, the most effective having either metal faces or being entirely of metal; in finishing off these tools are also of the greatest assistance, as glass-paper should on no account be used.

But it is when the more elaborate and intricate forms of ecclesiastical joinery are entered upon that the greatest demands are made on the skill of the workman; ancient work was, of course, all done by hand, and still fills us with admiration for its beauty, variety, and general excellence. Evidently in those days time was only a secondary consideration, and nothing was spared to make the work worthy of the high purpose for which it was intended.

"In the elder days of Art,
Builders wrought with greatest care,
Each minute and unseen part;
For the Gods see everywhere."

Unfortunately, at the present day, time is of so much importance that it is very difficult to devote the same amount of it to any particular work as the old men did; but there is ample proof, even now, that when cost is not the first consideration, work of high quality can still be produced.

Vaulted canopies require much care. These, if of any size, should be built up; if worked in the solid they will crack and twist, utterly spoiling the effect, and in addition be much more expensive; but if the ribs are worked singly, to the required sweep and section, rebated for the spandrels, then mitred together, the spandrels filled in afterwards and the whole covered at the back with strong canvas well glued, they will stand.

Very small and specially elaborate canopies must, of course, be cut out of the solid to a great extent.

The third system of mitreing already referred to (known as mason's mitres) now claims attention. It consists in working the returns of the mouldings in the solid of the styles, to stop those on the rails and on the rails and sills, and to stop the mullions. The actual working of these returns is done after the work is glued up. It is of necessity a more costly method than the others, but there can be no doubt that in such work as that before you (which will show the system clearly) it is the only proper way, and far stronger than any other.

Much old panelling was filled with linen fold-panels, which always look well, and several good ancient examples are before you. These, however, seem to have fallen into disuse, which is to be regretted, more especially as they are really inexpensive, considering the good effect produced, the play of light and shade being very pleasing.

In tracery great opportunities occur, but it is only when cut by hand that all its beauty is brought out, and endless variety can then be obtained. When, however, cost is of supreme importance, the aid of machinery can be called in, and by its use the mouldings worked, leaving only the angles and pockets to be done by hand, and if the cusp points are simply turned out the cost will be still further reduced; in sunk tracery the various sinkings can also be done by machinery; the least expensive section consists of a hollow, a second member, more especially if it is a bead, considerably increasing the labour.

How to treat the face of hard wood joinery frequently requires much consideration and deserves a passing notice. In the case of oak, the action of the atmosphere would tone it down admirably; but this takes time, and the first appearance of newness is often removed by the fumes of ammonia, which can be regulated to produce any desired shade, and the treatment is a

good one when the work is not subject to much handling; where it is, however, beeswax and turpentine are generally applied afterwards, as otherwise the damp heat of the hands will leave dark marks; care must, however, be taken that as much of the wax is rubbed off as possible, or the work will very probably turn yellow in time. After this application the oak will cease to darken, as the wax fills up the pores, and prevents any further action of the air.

Beeswax and turpentine alone also produce good results on most hard woods when well rubbed in, and a very pleasant surface is the result, much the same as the slight polish seen on an egg-shell. This treatment is also particularly useful for floors, these, however, require periodical attention. Simple oiling is never satisfactory.

French polishing is a very general treatment, but is too well known to need any description.

It is of the most vital consequence to remember that damp plays havoc with seasoned woodwork, causing it to swell and warp, it is therefore fatal to put it against damp walls; when it is impossible for these to have time to dry, the wood should be well coated at the back with a damp-resisting preparation, and not be fixed close against the wall.

Hard wood joinery is a dry subject—in fact, so essentially a dry one and affords so little opportunity for making a paper on it attractive, that it is much to be feared the present one has caught the infection and become in its turn thoroughly dry; still hard wood joinery is a matter which deserves some attention, and possibly the facts placed before you may induce a further study of the methods of working, which will certainly prove useful.

The introduction of machinery, although materially reducing the cost of production, has not by any means done away with the necessity for skilled workmen; skill, however, can only come by practice following long and careful training, and in some respects the two essentials requisite for thorough work, good workmen and good materials, bear a strong analogy in the careful preparation both require: the forest may contain the finest trees, but unless these are properly converted and allowed to season, much of their value is lost; and a youth may have all the natural qualifications necessary to make a good workman, but without proper training is never likely to reach a high standard of excellence; both the seasoning of the wood and the training of the youth require time—time which may seem at first sight wasted, but is really fitting each to become of real use. It must be a matter of regret to all who have the true interest of the British working-man at heart, that the system of apprenticeship has almost died out. No doubt it entailed much drudgery (this must, however, be encountered in all callings earnestly pursued), but it gave a man a better insight into his trade and a more thorough mastery of all its details than can possibly be obtained by any other means.

Really good men are as much in demand as ever they were, and the more care and attention a man bestows on his work and the greater the skill he brings to bear upon it, the more likely will he be to ensure what every good workman desires, constant employment; and beyond this will have the satisfaction of knowing that he is doing good work—a satisfaction dear to every earnest and honest worker, be he artist or artisan.

Mr. Owen Fleming, in proposing a vote of thanks to Mr. Barnes for his paper, said that the close contact of architects with those who had the practical working of materials under their care, must, he was sure, tend to further what they all desired, and that was the improvement of workmanship generally. He had listened with great care to what Mr. Barnes had told them about apprenticeship, and he could not but feel how important it was that the workmen of the present day should have some such system of training. But from investigations which he had been making into the training of the working man in London, he was convinced that apprenticeship on anything like a large scale was impossible in the future. He should, therefore, like to ask Mr. Barnes if he could indicate at all the necessary training in the future. He was very glad to hear Mr. Barnes talk so much about machinery. Machinery was now an essential part of most workmanship, and they must investigate the possibilities of machinery if they were to produce work at a reasonable cost and of a satisfactory character. Sometimes architects had to use a wood which should be a hard wood, but they were not able to know the cost of oak or teak. In some cases American white wood had been suggested to him as a substitute. He

should like to ask Mr. Barnes if that wood had really in it possibilities of use. Judging from the specimens exhibited that evening, he almost thought that in joiner's work scribing was a good form of joint. With regard to oak work—not for the best work, but, say, for a window-cill, and so on—one met with a large number of stains and cracks. Were those stains really disadvantageous to the oak except from the point of view of appearance? As to the cost of mouldings, he thought that it was important that architects should take every opportunity of visiting the workshops and talking with the men, and so finding out wherein lay the best possibilities of modern machinery.

Mr. C. Hindley, in seconding the vote of thanks, said, if he might presume to add anything to such an able address, he would direct their attention to what he might call the artful dodges of cabinet makers, and so caution everyone against them. There were many systems of making joints that were quite right to be used in cabinet work, and which were quite wrong in joinery. The right way to fix a moulding on the panel, if it was to be fixed on the panel, and not on the frame, was to screw it behind and groove it, if possible, to the panel; but they would find that a good many people who made those things would either fix it on with glue, and perhaps supplement that by putting a few needlepoints in. There were a good many risks attending such a process as that. He thought Mr. Barnes might have added a little more on the subject of the difference between cabinet work and joinery in framing up a panel, and also something about the glues that were used by joiners and cabinet makers. He thought that joiners generally used the Scotch glue, which was rather heavier, and though the French glue was not so strong—he thought the difference between the breaking strain in Scotch and French glue was, that the former would stand a strain of 3,000 lb. to the square inch, and the latter about 480 lb. or something like that—it was a very good method to combine the two.

Mr. S. B. Beale said that there was one point which struck him that might be discussed, and that was what he might almost call the moral ethics of modern joinery. Mr. Barnes took it for granted that the best way to carry out elaborate joinery work was to build up in sections. Mr. Barnes had shown some excellent examples of old Medieval work, but they all appeared to be cut out of the solid, and as young architects had, as a first tenet in their creed, to admire everything of a Medieval character, they were a little astray. According to Ruskin's teaching they ought to make everything as good at the back as the front. When he (the speaker) was told that it was the proper thing to build up a section, he wanted to know whether that was correct in hard wood joinery? Recently he saw the drawings of the newell of a staircase which was designed by a well-known man, and which was to be carried out by a firm which had a great reputation in hard wood joinery. This newell was built up of 30 or 40 pieces. The mouldings were put in separately, and, of course, to the amateur eye, it looked a solid piece of work when finished, and no one could tell that it was made up of those many pieces. They might imagine what would happen in a few years' time when, possibly, the perishing of the glue would make a piece or two drop out of it. But if they had a Medieval newell, made of good solid oak, they might racket on the staircase as much as they liked without doing any harm. It seemed to him to be a regrettable fact that good hard wood joinery was not turned out in many builders' shops at the present time. There were probably not half-a-dozen shops in London which turned out first-class work, and if they looked for a moment at the causes which had been at work to bring that about he did not think it was a matter for congratulation. It seemed to him that the whole question was one of money. Competition was answerable for a great many things.

Mr. W. S. Weatherley said that with reference to the question of building up, it was common knowledge that in Gothic work in the fifteenth century it was the proper thing to do, and the solid work really died a natural death. There was a matter which rather interested him in hard wood joinery. In external doors of churches, however beautifully they were made and whatever woodwork they might have, whenever they were covered with ironwork, they became, in a short time, covered with ink streaks, owing to the acid of the oak acting upon the iron. It had been suggested as a remedy to use aluminium; but that did not answer. Another suggestion was to have a deposit of bronze upon the iron.

Mr. Max Clarke said that Mr. Fleming had touched on a most important point, and that was as to what was to become of the British workman in the future, and how was he to be educated. The prospect for them, as far as he could see, was to try and get out of London as fast as possible and get into the country, where, although there might be the grindstone to turn for a period, they would have later a chance of exercising their brains, whereas if they remained in town they would be turned into machines from the constant attendance on machinery in shops. With regard to white wood he believed that it was very free from warping, and that it was very good for shop fronts, but for cabinet work he did not think it would be desirable. Oak stains on doors with iron were a very objectionable feature, but it was quite curable by having the hinges of the doors galvanised, and the nails galvanised also before they were put in, and then they could have them blackened after that. That would be a cheaper method than bronzing. With regard to teak it had a most objectionable smell.

The President, in putting the vote of thanks, said that with reference to the building-up question it was to be remembered that it was not the cost of the oak alone that made one use small pieces, but it was that oak in small pieces stood so much better than in large ones. There had been some reference made to Medieval oak work. Those who went on the excursion last August in Norfolk and Suffolk saw some of the screens—some of the richest he ever saw—where the cupings of oak were only half an inch thick. It had somewhat of a metallic effect, being so thin, but there was an appearance of richness which could hardly have been obtained by having the cupping cut out of the solid piece of oak. The difference in the quality of workmanship was very noticeable, and that was why he had one great point to pick with the trades unions. They made a great deal of fuss about the men getting their proper wages, and being paid on the recognised scale, but he had never heard that they took any interest in the quality of work turned out. So long as a man received his pay, it did not very much matter what work he did. Mr. Barnes did not refer to one material which took a leading part in modern joinery. That was putty. He had seen pieces of framework, and he might safely say to per cent. of it was putty. There was one thing about the putty which Mr. Barnes had referred to which he should like explained. At the wish of the donor it was fumigated, and after fumigation the grain was not nearly so apparent as it was before, and it gave a sort of deadness to the thing which was regrettable. With regard to the different kinds of oak, in his opinion there were scarcely any two builders who agreed as to which was the best oak. The vote of thanks to Mr. Barnes was then put and carried by acclamation.

Mr. Barnes, in reply, said he hoped that his paper might form the starting-point to those who had not given much attention to the subject. He could assure them that if they did they would soon find out how to design mouldings at a reasonable cost, without losing effect, and also become acquainted with the nature of the materials and the possibilities of modern machinery. On the question of necessary training, considering that apprenticeship had gone out, he could only say that at the present time it was one of the great problems of the day, and one which was bearing more heavily on the British workman as time went on; and it would continue to do so unless some satisfactory method could be found out for taking the place of the old system of apprenticeship. Scribing had been referred to; there were cases in which it must be done, but, generally speaking, it was unsatisfactory, as it left a feather edge on the mouldings. With regard to stains, it depended very much what they were. A great many of them were the first signs of decay, which, of course, were objectionable, but when arising from other causes they did not materially affect the stability of the work. Scotch glue might be stronger, but if they used good French glue they would get very good results, and the latter was lighter in colour. Building-up of sections was not advocated in consequence of modern competition, but because it was not only the cheapest, but the best method.

The meeting then terminated.

PARTNERSHIP ANNOUNCEMENT.—Mr. Morton M. Glover, A.R.I.B.A. (late Glover & Salter), and Mr. Francis E. L. Harris, A.R.I.B.A., have entered into partnership, and will practise at 46, Queen Victoria-street, E.C., under the style of Glover & Harris.

ARCHITECTURAL SOCIETIES.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.

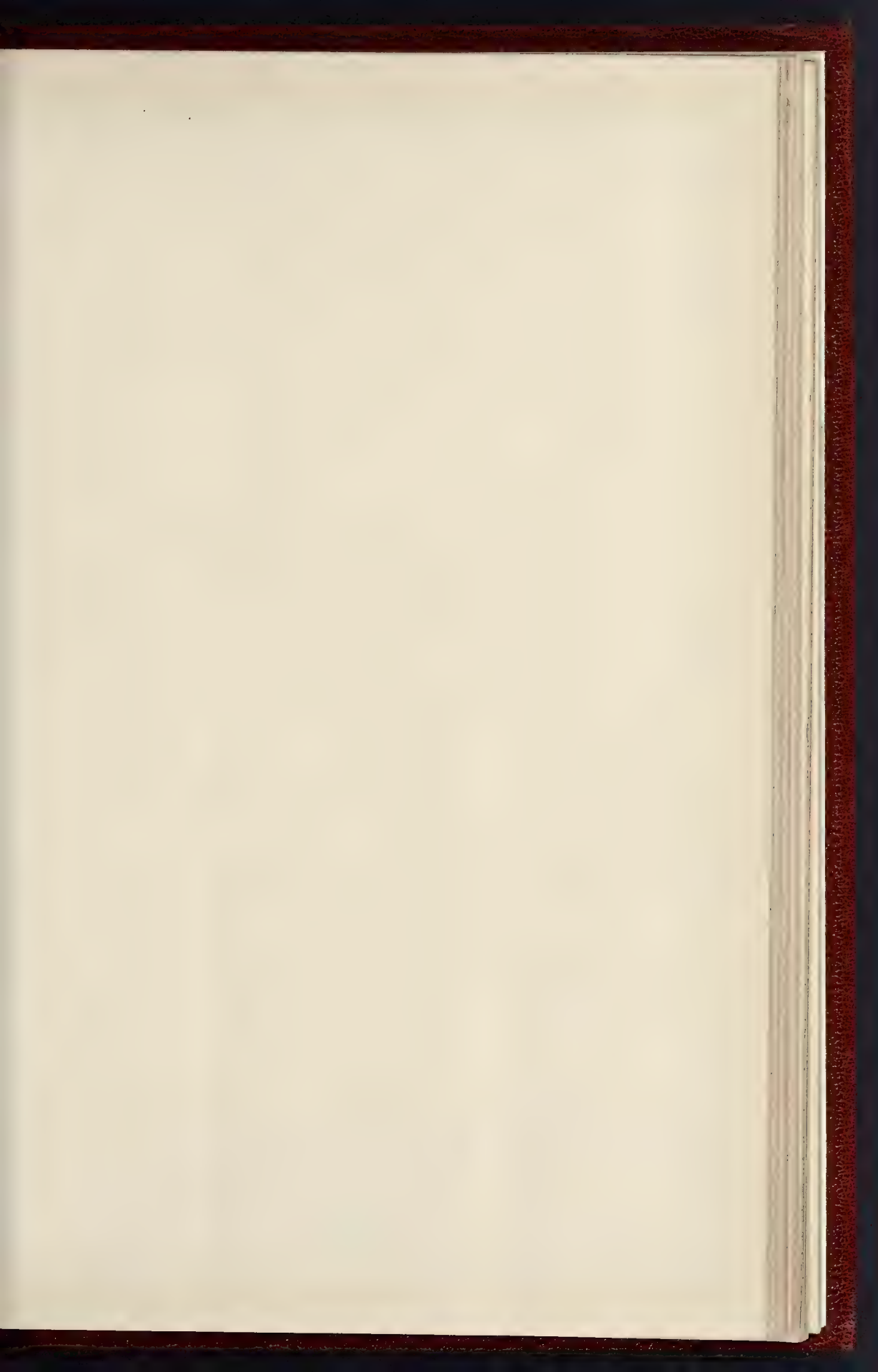
—A conversation to inaugurate the session for 1893 and 1894 was held on the 21st ult. at the Grand Hotel, Birmingham. Upon the tables and walls of the Windsor room were arranged a collection of drawings and photographs lent by Messrs. Aston Webb & Bell, Ernest George & Peto, Colcutt, Wilson, Hennings, and Mountford, of London; Messrs. Henman, Newton & Cheate, Cox, Evans, Swan, Reynolds, Bateman, Mousley, and Harold Baker. There was present a company of about seventy. Mr. John J. Bateman presided in the absence, through illness, of the President, Mr. W. Hale.

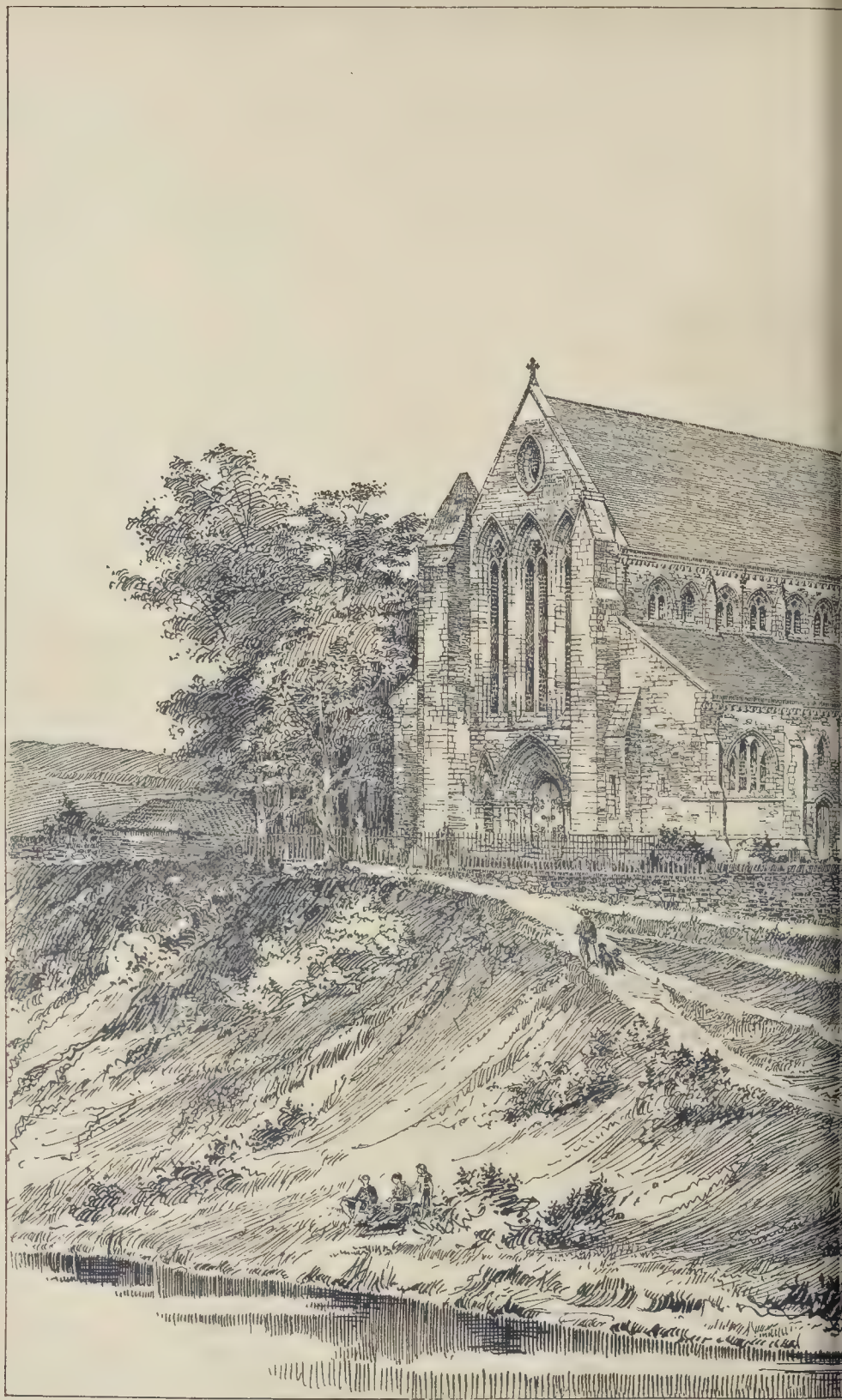
SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The usual monthly meeting of this Society was held at the School of Art on Tuesday evening. Mr. E. M. Gibbs, President, presided, and a paper was read by Mr. H. W. Lockwood on "Architectural Practice in America." After a short sketch of the history of architecture in the States, an account was given of the present method of training for the profession, which was in the main characterised by the substitution of the student in an academy for the pupil in an office. The main points in the usual academic course were given, much stress being laid upon the open-air work provided in the way of periodical visits to buildings in progress. The extent to which speed, demanded from everybody in the States, has affected the practice of architecture was shown by a lifelike sketch of everyday work in a New York office, with its division and subdivision of work, this departmental system giving speed at the expense of interest. Quantities, as with us, were seldom, if ever, supplied. In very few cases was a clerk of works, as understood here, employed. In consequence of the extra work entailed by this, and some of the legal conditions surrounding the profession, and to a minor extent by the absence of the pupil, the expenses of an office in the States were much greater than those of a similar one here. Some amusement was caused by quotations from a specification written in rhyme, such poetical form having been adopted (on one occasion only) by a New York firm in reply to a complaint that the ordinary specification was dreary reading. Assuming that for an essentially national style, the domestic architecture of a country must be looked to, the "Frame House" was taken as one of the most distinctive of the habitations of man in the States, and its evolution, plan, and appearance were described. The paper closed with an appreciative criticism of the American architecture of to-day, finding in it the defect, especially in church design, of a want of the feeling of reverence, and of an appreciation of the poetical. These, however, would come with experience, and the strength and originality of the work of young America gave sufficient guarantee that these wants would in time be well supplied.

ARCHITECTURAL SECTION OF THE GLASGOW PHILOSOPHICAL SOCIETY.—The third meeting of the Architectural Section of the Glasgow Philosophical Society was held on the 27th ult. in the rooms, 207, Bath-street, when Mr. Malcolm A. Macbean, A.M.Inst.C.E., read a paper on "Town Drainage." Dealing with the disposal of sewage, he pointed out that precipitation by chemical agents was the hope of the present, combination with filtration, &c.

ENGINEERING SOCIETIES.

LIVERPOOL ENGINEERING SOCIETY.—The third ordinary meeting of this Society was held on the 22nd ult., Mr. H. Percy Boulnois, M.Inst.C.E., President, in the chair, when a paper was read by Mr. Ivan C. Barling, A.M.Inst.C.E., entitled "The Adjustment of Surveying Instruments." The author pointed out that in a single evening it would be impossible to treat exhaustively of many of the instruments used by the surveyor, so perhaps it would be better to limit the paper to those two most accurate ones which he uses, viz., the Dumpy level and the transit theodolite. In regard to these Mr. Barling observed, among other things, that it was essential that if accurate work was to be done the optical axis of the object-glass must pass right down the centre of the draw of the telescope tube, otherwise when the focus is altered the cross webs will not cut the same point. Probably it would be a good thing if the optician, when making the instrument, could arrange the cell carrying the object-glass so as to accomplish this end.



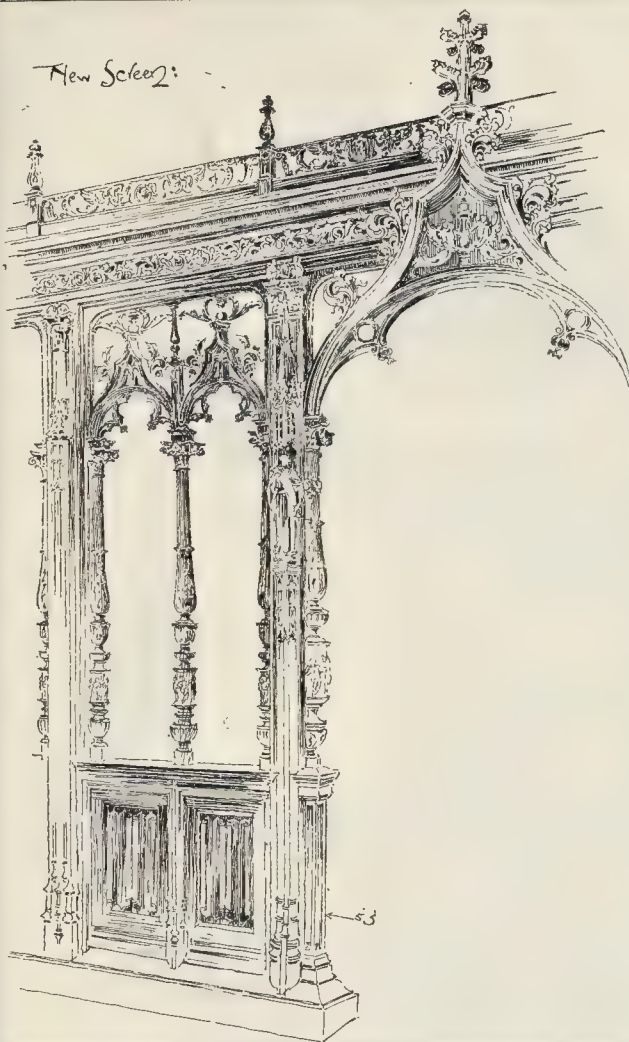


THE ANCIENT CATHEDRALS OF S

N. 10. DUNBLANE



DRAWN BY MR. ALEXANDER MCGIBBON.
SOUTH WEST



Illustrations.

DUNBLANE CATHEDRAL.*

T present a special interest attaches to this Cathedral, reopened but a month ago after restoration, when it is almost impossible to avoid making comparison between its former and its present condition, for although carried out on the most conservative lines, the changes effected are considerable; but the more important of these it will hardly be questioned are all for the better. The nave that for nearly three hundred years has been uncovered is now roofed, the windows glazed, and so again it becomes part of the church. The partition wall at the chancel arch is removed, opening up to view the vista of nave and choir so long interrupted.

St. Blane's lacks the variety of style that gives antiquarian charm to most other cathedrals for, with the exception of the tower, the building is of middle thirteenth century date; but what is wanting in this respect is fully compensated for

in the excellence of the one style of architecture displayed.

St. Blane, the founder, was connected with, if not a native of the island of Bute, where there is a chapel dedicated to him, of about the same date as the Dunblane tower, that is the beginning of the twelfth century. A contemporary of Columba, about the year 600, he was bishop or prior of a Celtic monastery at Dun Blaan, but no architectural vestige remains of his period, unless the cross, set up in the nave north aisle, be of that age. Thereafter Briton and Norseman in turn ravaged the settlement; still the situation was never wholly abandoned, and ultimately it was occupied by the Culdees, though the particular date of their settlement is uncertain; they appear in Scottish ecclesiastical history with the 9th century and continue till the beginning of the 13th century; the fraternity at Dunblane would seem to have been among the very latest. It was during Culdee rule that the diocese of Dunblane was founded, by David I., the patron of so many Scottish religious houses, in 1140; later, some think, in his successor's reign, and by an Earl of Strathern. This is not very clear, but it is certain that the heads of that powerful house were the patrons of the See for the succeeding three centuries, until 1442, when the Earldom terminated, passing to the Crown. On the authority of Fordun it has long been held that in 1180, an Earl Gilbert gave a third of his earldom to the bishopric, but if

such was ever done, his munificent liberality must somehow have been intercepted, for in 1233 the condition of the fabric was so bad and the service so mean that a new Bishop, Clement, 1233-58, could make complaint to the Pope that the building was roofless, the clergy reduced to one chaplain who but thrice a week said mass, and the revenue insufficient to support the episcopal dignity for six months. The energy of this great Bishop, originally a poor friar of the Order of St. Dominic, is seen in the fact that at his death, twenty-three years later, Dunblane was left a well-organised diocese with the stately building that we have to-day. The Norman tower is supposed to date about 1100 or 1110; what the plan was of the church of that period is uncertain, there is now no evidence to show. There is a door in the north side, and a window to the east; a stair occupies the S.-W. corner. The floor is some 3 ft. higher than the level of the present church. The door has disengaged columns with capitals and bases; the window internally has a hood-moulding, enriched with the zig-zag ornament. In the third story, on all four sides, are small arched openings divided by columns. The stages above this portion of the tower were added in the sixteenth century, the battlemented parapet latest of all, by Bishop W. Chisholm, whose crest is seen on the south side, at which time he also built the parapet of the choir, using throughout the same red stone employed five centuries before by the Norman builder. The total height of the tower is 128 ft.; in the belfry is a bell dated 1612. The two stories under the battlements are of a yellowish sandstone, while the Cathedral as a whole is of grey colour. Why the builders of the nave permitted its aisle to be cut into by the tower, and that at an oblique angle, seems only intelligible on the supposition that the tower was quite detached from the early church that occupied the site of the present choir. The new nave as an extension thereto was built on the axis of the old church, and so its aisles came to enclose partially the tower; that the obstruction was not demolished is remarkable.

When the nave was completed, the old church—of which only a few fragments of a Norman arch are preserved—gave way for the new choir, whose ruder workmanship is evidence that whether or not the development had from the first been contemplated, when it came to be executed the money was scarcer than it had been, for everything is plainer than in the nave. The nave has north and south aisles, but these are not vaulted, so there is no triforium; the clearstory is a very graceful traceried double arcade, a passage way between, with two double lights to each bay. There is a north and two south doors; the finer of these, the eastmost, at one time possessed a porch, now quite destroyed. At the south gables of both aisles are traces internally of arches now filled up, solid on the north aisle, with a window in the south; not unlikely at first these were openings to the earlier church.

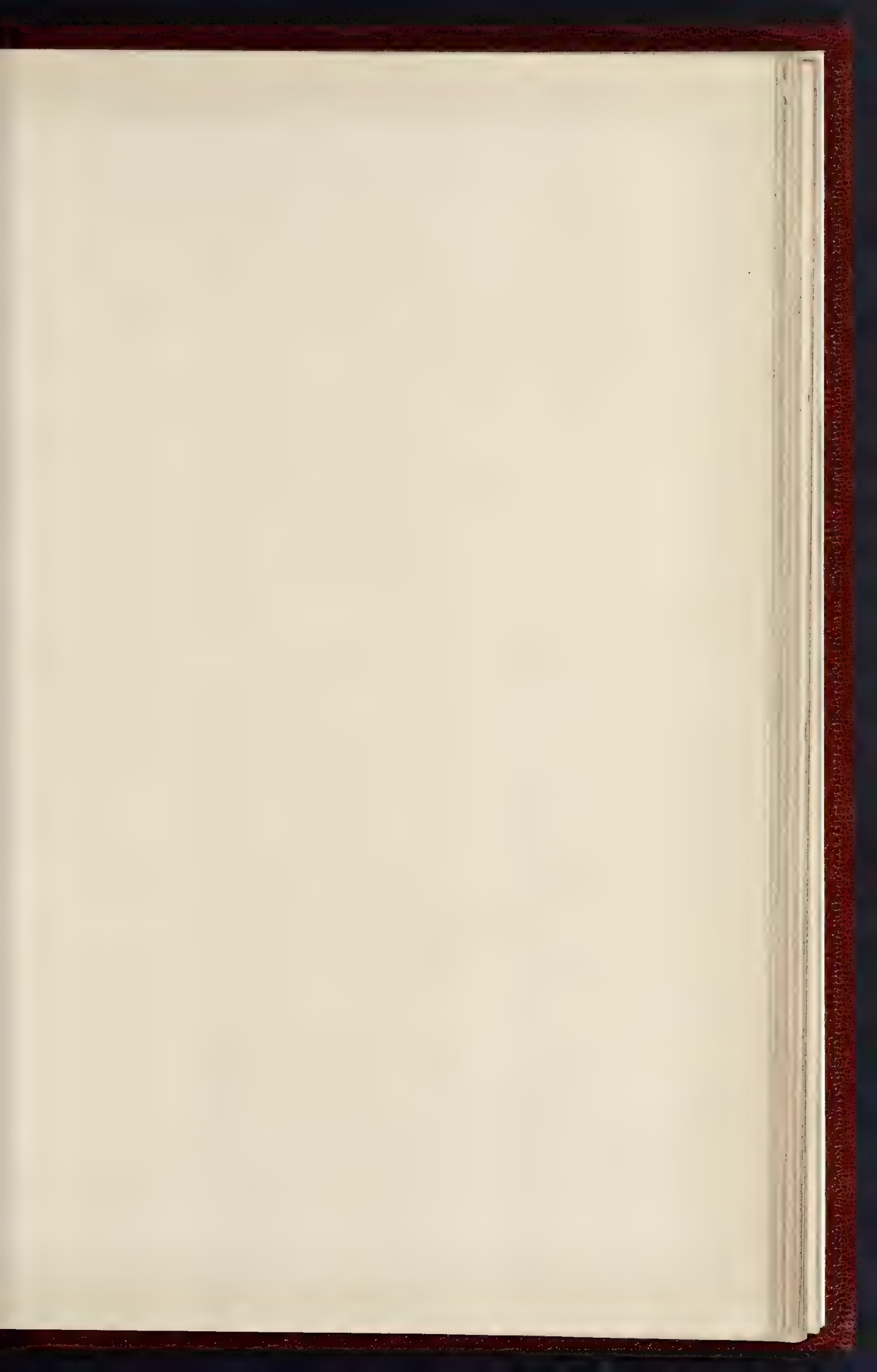
The west gable is both graceful and dignified; there are no windows in it to the aisles, interest being concentrated within the wide buttresses. The doorway is a single opening, widely splayed, of five orders of mouldings. In the arch these rather lose distinctiveness through want of any enrichment, and present rather too much the appearance of a mere receded plane. On either side of the door are shallow arched recesses, with cusped heads; above is the well-known window of three double lancets, rising to an equal height, cusped circles forming the simple tracery; internally the effect is finer, for there is a double arcade, the inner one unglazed. In the apex of the gable is a vesica window, noticed by Mr. Ruskin in his "Edinburgh Lectures." The aisle windows are simple but effective; four lights within an arch, almost semi-circular. There has been some dislocation at the north-west corner, where are two ugly windows of three lights under an almost flat arch; these it is thought may be the outcome of Reformation violence, but it is not certain; the clumsy restoration appears to date about 1568, and not improbably was the work of the Crown authorities, for at that time it is known the king was petitioned by the Kirk to help in preventing Dunblane falling to ruin. Above the clearstory windows of the nave north wall, the ashlar facing has been stripped off, apparently for local building purposes, and the rough rubble is exposed.

There are no transepts in this Cathedral; the only sign of where their presence might be expected is given by the small gables rising from the aisle walls, but not to a height that interrupts the sill of clearstory windows. The choir is built of the same width as the nave centre aisle,

* The series of illustrations of the "Ancient Cathedrals of Scotland," which was begun in our issue of July 1 last, will be continued in the first number of each month, until March, 1894. Particulars of this, and of the series of "Cathedrals of England and Wales," which ended in June last, will be found on page 424. A short series of the "Ancient Cathedrals of Ireland" will follow the Scottish series.



New Oak Pulpit
panels inlaid

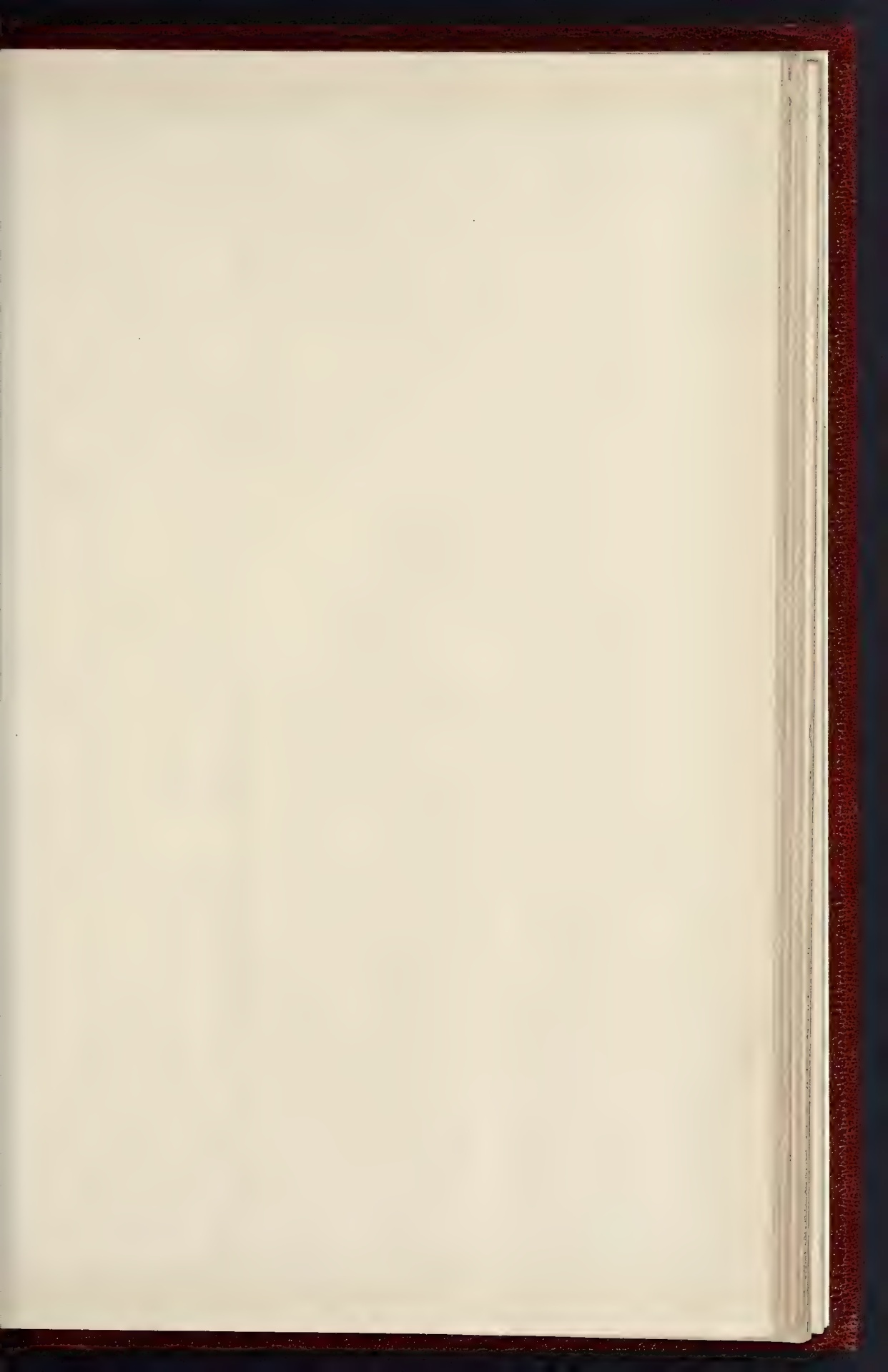


THE BUILDING, DECEMBER 3, 1893





DE NEAVE CATHEDRAL BEFORE RESTORATION. VIEW IN THE NAVE, LOOKING WEST.
FROM A WEST WALL DRAWING BY M. R. P. AND S. T. R. L. E. A.





JOAN OF ARC TAKEN PRISONER AT COMPIÈGNE.

JOAN OF ARC AT

DESIGNS SELECTED IN COMPETITION FOR THE NEW WINDOWS FOR

DESIGNED BY M. JACQUES G.

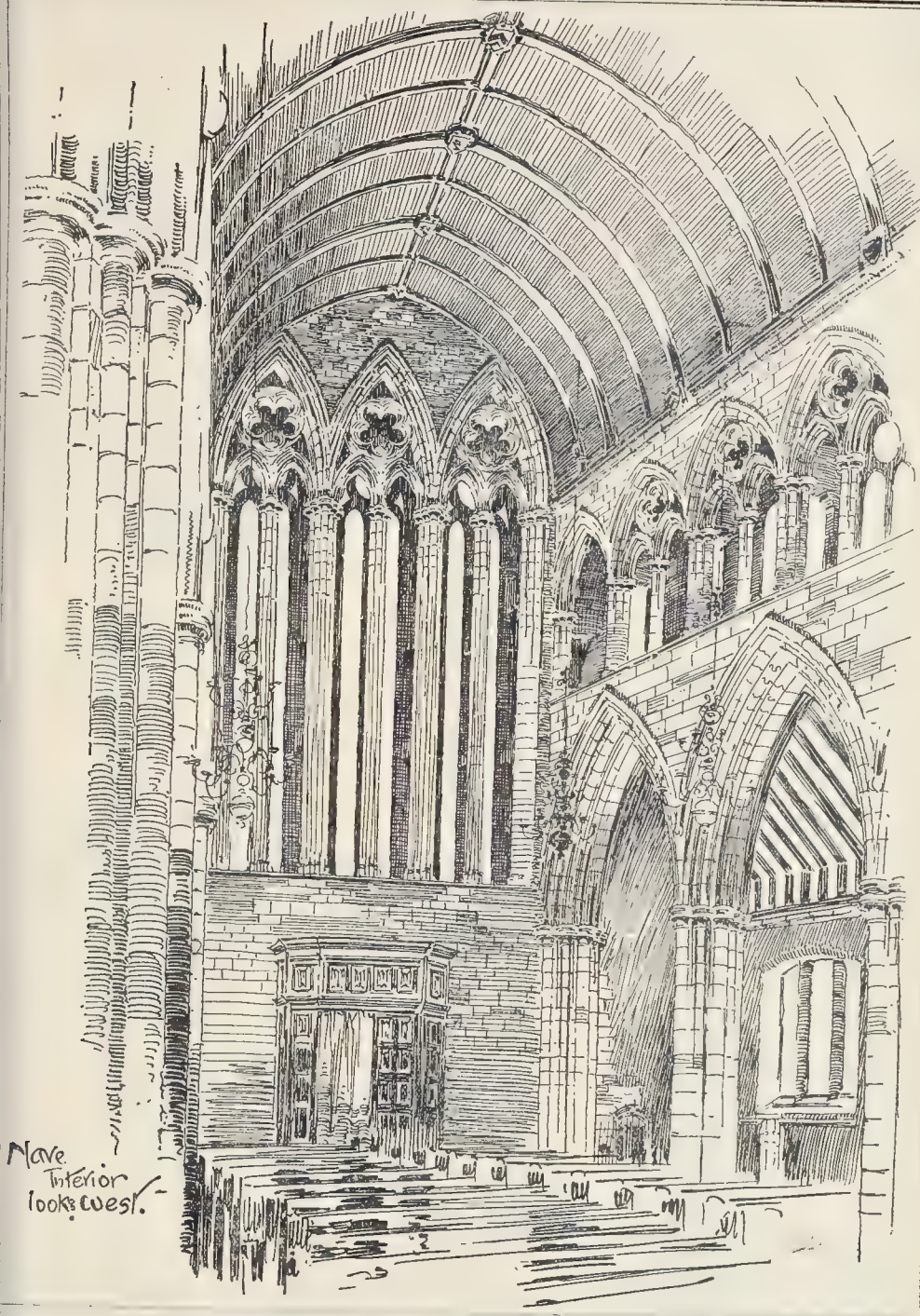


AT RHEIMS.

JOAN OF ARC AT THE ASSAULT ON TOURELLES.

ERAL OF ORLÉANS, ILLUSTRATING THE HISTORY OF JOAN OF ARC.

ORATION WITH M. GIBELIN



Nave
Interior
looks west.

and its floor is on the same level. It has no aisles; the south wall are six tall four-light windows, but one only north of the altar, otherwise that wall originally possessed only a clearstory and a triforium. This door gives entrance to a long vaulted transept that occupies the position customarily given to a choir aisle; it is variously called the Chapter House and Lady Chapel. There is no triforium, but not improbably the two eastmost

bays were screened off and did form such a chapel.

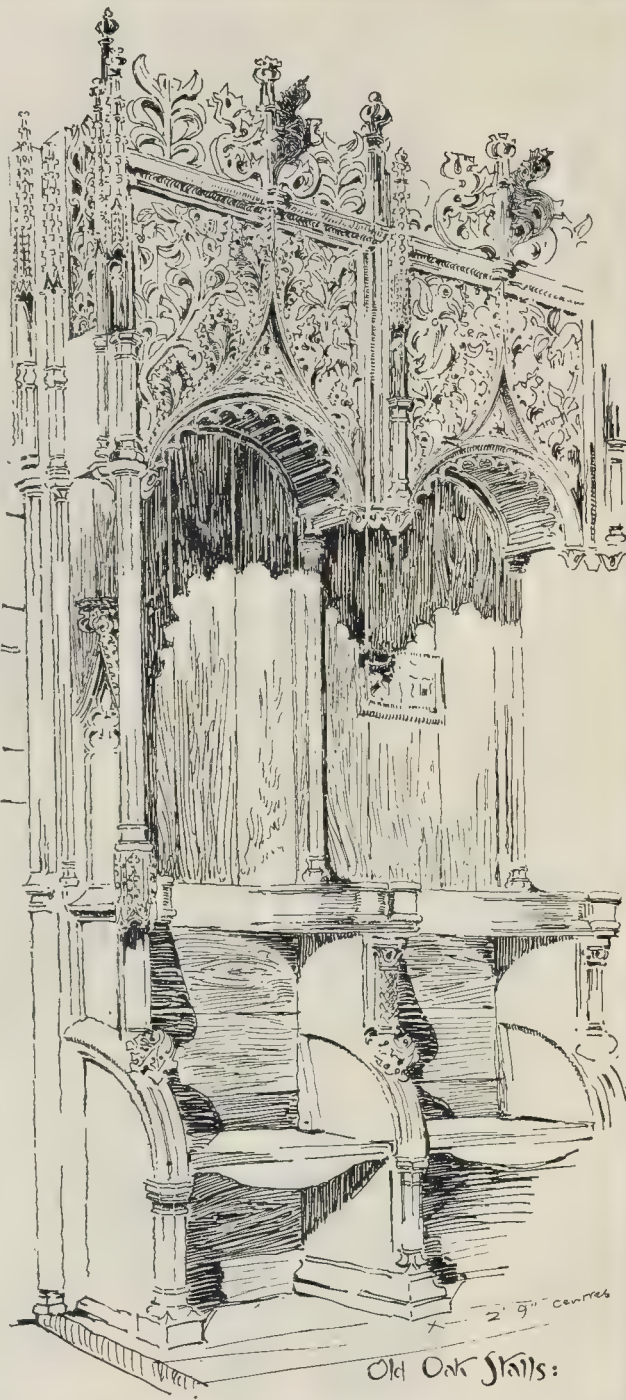
The "Chapter House" did not extend quite west to the nave, a small passage and corner stair to the apartments overhead intercepting; these apartments were probably a sacristy and another small chapel. The Chancel arch is but low, and permits of the wall above being pierced with a double opening; between its columns is the clear-

story passage connected at a few steps higher level. This cross passage and the presence of certain sockets cut in the gable in its nave side that appear suited for supports to a small gallery, have had a purpose attributed to them—the exhibiting of relics to the congregation. The original tracery and mullions of the choir side windows have gone, and this is also true of the great east window. The inside jambs of the

side windows are plain splays. The ribs of the vaulted chapter house and chapel are rather coarse, all showing that here less labour has been bestowed than upon the nave. The choir roof is the lower, but by the addition of parapets—of red stone as before noticed—the external wall-head of both choir and nave are level. About the time that this latest addition was made, oak stalls were added that are yet preserved, rather rough in execution (some centaurs in the carving show Renaissance influence), and not to be compared with the more characteristic geometric woodwork of King's College, Aberdeen, but valuable because in Scotland so little ancient church furniture is left. It is known that there were eight altars, but their positions are uncertain; besides the High Altar and that of the Lady Chapel there was one in the east of the south aisle dedicated to the Trinity; but now of font or altar there is no vestige. Even before the Reformation the church's spoliation had been anticipated in respect of the movables, and the fabric does not seem to have been well cared for, the nave particularly being in bad repair. In 1559, under the Earl of Argyll and the Prior of St. Andrews, the church was "purged" of its Romish embellishments. Not everything ornamental was, however, objected to. Slezer, over a century later, saw a painting of a Countess of Strathearn asking a blessing of St. Blasius; but the north aisle, as mentioned, was, either then or subsequently, damaged, and the nave roof too, so that thereafter the choir only was used as a Protestant cathedral. Of the Episcopal ecclesiastics, Bishop Leighton, 1661-71, was the most distinguished; at his death he bequeathed a fine library to Dunblane. In course of time, under the Presbytery, galleries were erected; one very early was built across the east window. In Slezer's "Theatrum Scotiæ, 1692," there is depicted an outside stair at the south side, giving access thereto. The wall tomb in the north wall was covered up, and the one in the south transformed into a doorway.

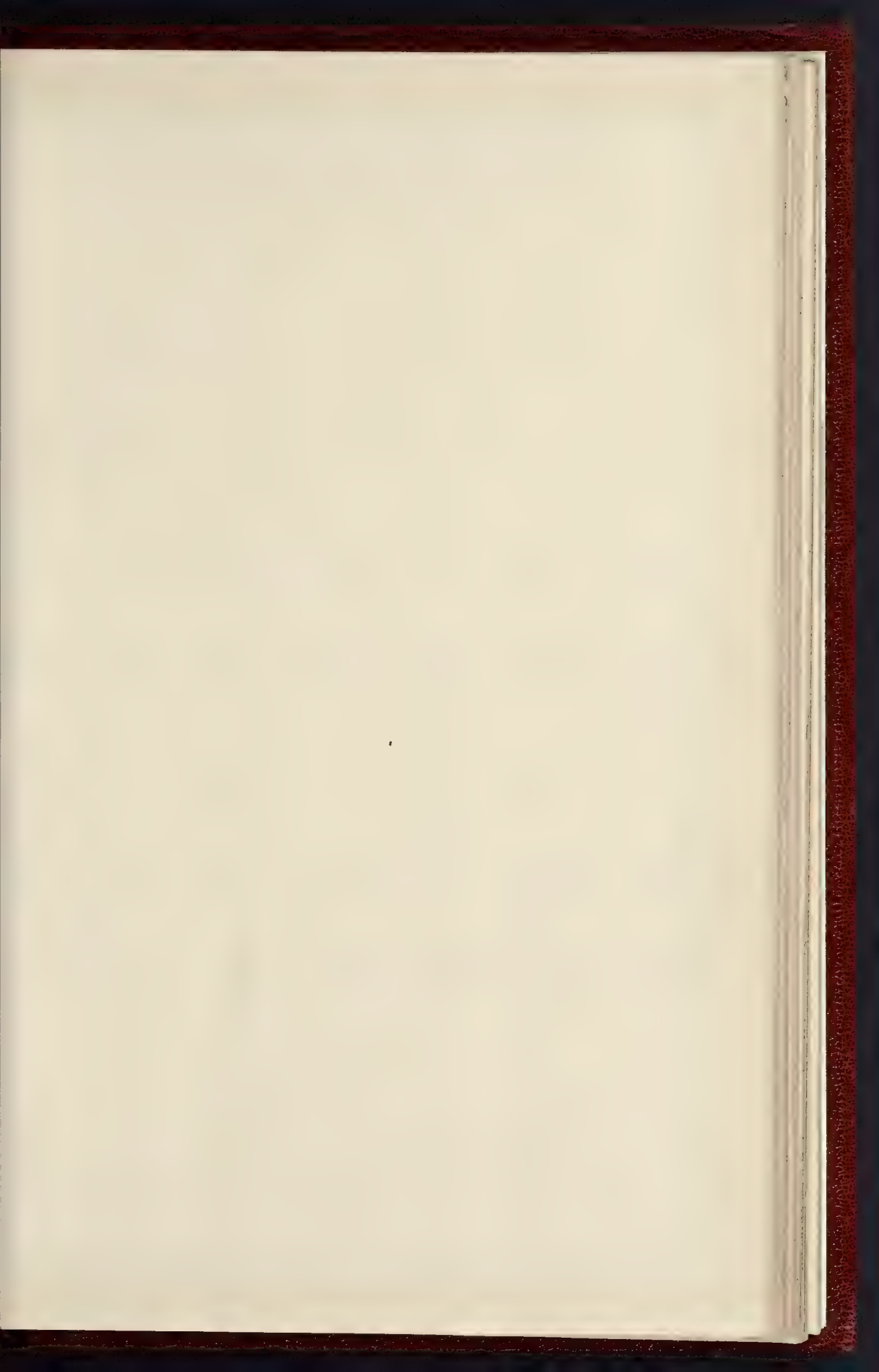
So the church remained till the early part of this century, 1818, when the first restoration was begun, but only the choir was affected; its galleries were all cleared away, excepting a small one at the west wall, in which later an organ was placed; the south door was built up, but the tomb was irrecoverable; the windows had new tracery given them—most likely the earlier had pretty well disappeared; the new window filling was an improvement, but at best it was poor stuff. The recent restoration*—at an expense of some 30,000*l.*, almost wholly defrayed by Mrs. Wallace, of Glasingall—as a simple preservation of the nave walls as they were, without thought of restoration except to their original purpose of supporting a roof and so forming again a house for worshippers, has come none too soon. It is, indeed, remarkable that the nave arcades should have stood so long, quite unsupported as they are by either buttress or tie. The long exposure has weathered the stone very much, quite obliterating many of the mouldings of capitals and bases, but no attempt has been made to replace them with fresh stone, only so far as structural requirements demand has that been done; mullions and columns wanting have been replaced, but the doorways, all mutilated as they are, remain untouched; even the two uncouth sixteenth-century windows of the north aisle have been retained. More has been deemed necessary in the choir; its former plastering has been replaced by a facing of ashlar, and new mullions and tracery have been placed in the windows. In the north wall tomb is the effigy of a bishop, for long considered to be that of Bishop Dermoch, who, in 1419, built the bridge over the Allan Water, but now surmised to be none other than Dunblane's greater benefactor, Bishop Clement. The organ is placed in the story above the Chapter House, but besides the necessary breaking through there of the old wall, two openings have been made; the space is now no longer required for either sacristy or chapel, and as a triforium proves very effective, relieving the bareness of the wall already remarked on. The new gables in the aisle walls—the incipient transepts—have their windows restored in accordance with the west gable type, partly plate, partly bar tracery, as no trace of the original model remains. The roofs are covered with green slates, of pleasant colour in one or two variations of shade, but the texture is unpleasantly smooth and regular. The new stone used has been taken from three or four quarries, so the appearance of raw newness is avoided without recourse to any

* The architect of the restoration is Dr. Rowand Anderson.

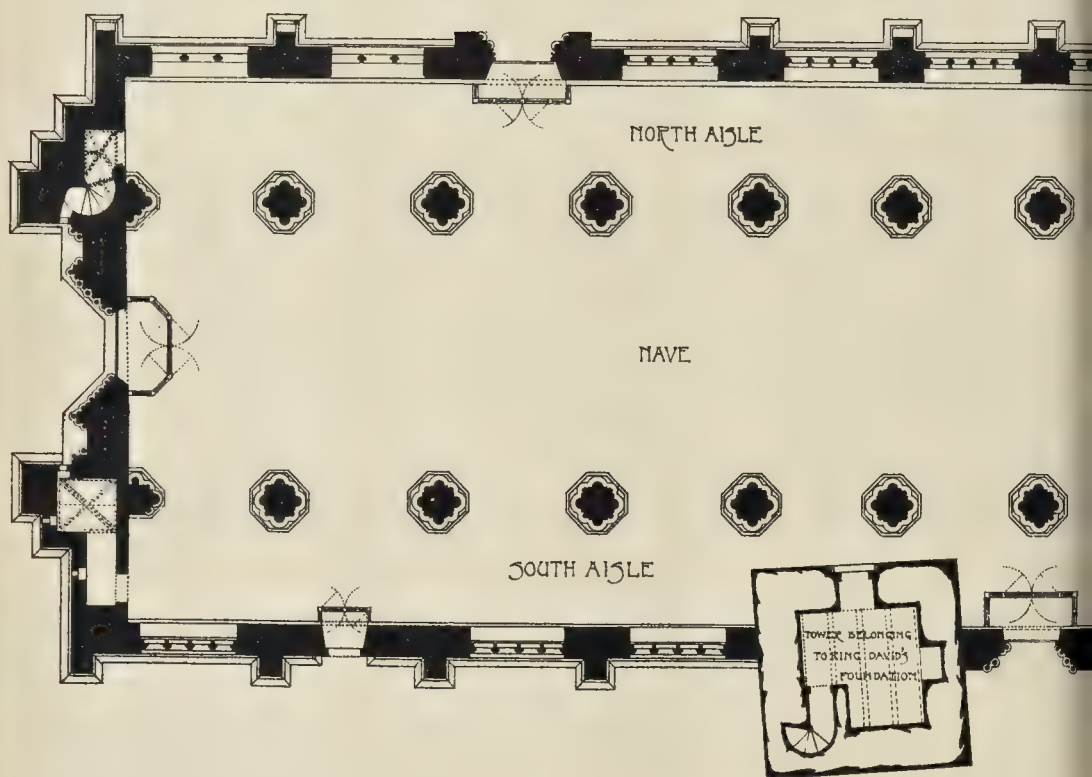


method of fictitiously ageing the masonry. The exposed woodwork of the roofs is of darkened oak—structurally, steel has been largely employed in the principals—and points of colour are introduced in the emblazoned shields on corbels and bosses of the historical patrons of the see. The new screen, pulpit, and organ-case are also of oak; in style they show a blending of Renaissance and Gothic forms. There are pendant gas coronas in the nave, wall sconces in the choir, with two large

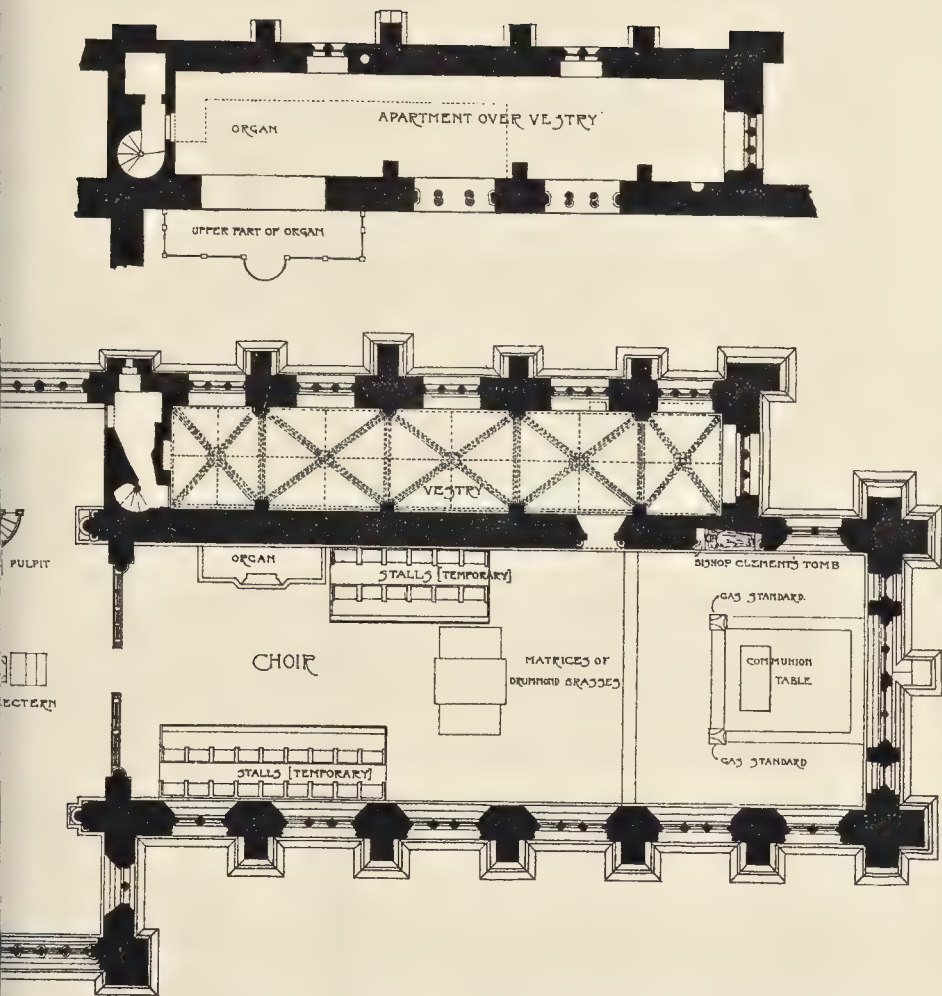
Renaissance standards at the communion table and a lectern, all of brass. Besides the sculpture figure in the choir tomb there is another, of Bishop Michael Ochiltree, 1429, in the nave south aisle; the recess has a straight-sided arch top, and the figure would seem to have been cut to suit its size. There is also a double effigy of a Lord Strathearn and his lady, 1271, cut from the one block of stone. In the choir floor are three rough slabs that may once have had brass



DUNBLANE CATHEDRAL

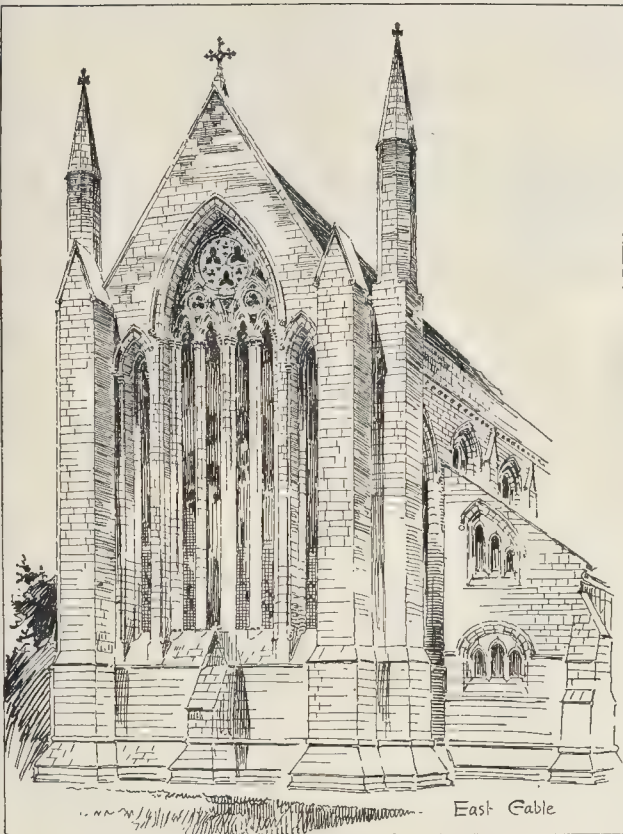


TOWER - 11TH OR EARLY PART OF 12TH CENTURY.
 THE MAIN BUILDING - CIRCA 1250



SCALE 0 5 10 20 30 40 50 60 70 FEET

R. ROWAND ANDERSON LL.D.
ARCHITECT
Edinburgh



East Gable

affixed, commemorating Margaret, wife of James IV., Euphemia and Sybilla, three daughters of Lord John Drummond, all treacherously poisoned at a breakfast in 1501 to permit of the king's matrimonial alliance with England. In the north aisle are preserved the various fragments found; and a Celtic cross has been built into the floor upright. In Walcott's book is shown the situation of the various houses of the church dignitaries; several were extant in Sleszer's time, but only traces and fragments now remain. Besides the books already noted having reference to Dunblane, there is Grose's "Antiquities" (Scotland), whose drawings were made in 1790, Bishop Pococke's "Letters," 1760, and Billings. In the "Scots' Magazine" for November of this year is a notice by Dr. Cooper, of Aberdeen.

VIEW IN NAVE OF DUNBLANE CATHEDRAL.

This view, taken from a water-colour drawing made a good many years ago by Mr. R. Phene Spiers, shows the western portion of the interior of the nave of Dunblane Cathedral as it stood roofless before the recent restoration.

While entirely approving of the steps which have been taken to fit this long-deserted church for its original purpose as a place of worship, we thought it would be of interest to give also a record of its appearance and state previous to restoration.

WINDOWS FOR ORLÉANS CATHEDRAL.

The designs for stained glass windows for the Cathedral of Orléans are selected from among the set, designed by M. Galland and M. Gibelin, which have been selected in the competition recently mentioned in our columns.

The following subjects for ten windows were given to the competitors: (1) Domarmy; Joan listening to the voices; (2) Vaucouleurs; Joan on horseback setting out to interview Charles VII.;

(3) Chinon; Joan presented to the king; (4) Orléans; Joan entering the Bourgogne gate; (5) Orléans; Joan at the assault of the fortress of Tourelles; (6) Joan giving thanks in the Cathedral; (7) Joan at the coronation at Rheims; (8) Compiègne—Joan taken prisoner; (9) Rouen; Joan prisoner in the tower of the château; (10) Rouen; execution of Joan. The windows illustrated are those representing subjects 5, 7, and 8.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday at the County Hall, Spring Gardens, Mr. John Hutton, Chairman, presiding.

The Question of Wages.—The Parks and Open Spaces Committee reported that their attention having been called to the fact that there were in the employ of the Council six men who acted as lavatory attendants at parks, &c., and a caretaker who received 18s. a week each, and another caretaker at 20s. a week, they recommended:—"That all men employed at parks and open spaces, other than those engaged by the hour, be paid 4s. a day."

Mr. Doake proposed as an amendment that the words "not less" be inserted after the word "paid" in the recommendation.

Mr. Grosvenor seconded, and the amendment was agreed to.

Mr. Torrance then proposed to refer the whole matter back for reconsideration. He said that he had every desire to pay men fairly, but the Council, in whatever it did, should remember the ratepayer. The men in their employ to whom they paid less than 4s. per day were men whom the Council had taken on out of compassion, and they were in no sense able-bodied. The only effect of the resolution if passed would be to result in the dismissal of the men.

Mr. LEMON seconded the amendment. Upon a show of hands the amendment was

declared carried, and upon a division there were for the amendment 62, against 30.

Analysing London Water.—The Water Committee reported that their attention had been directed to the desirableness of an independent examination on behalf of the Council of the water supplied by the London Water Companies which derive the whole or part of their supplies from the Thames or Lea. They were of opinion that samples might be taken twice a week from the mains of the different Companies and from the rivers in the vicinity of the intakes, omitting the Kent Company, which derived its supply entirely from wells in the chalk. That would give sixteen samples in all, and the expense would not exceed ten shillings a sample. They recommended:

"That, subject to an estimate to be submitted to the Council by the Finance Committee as required by the Statute, the chemist be instructed to take sixteen samples weekly of the water supplied by the London Water Companies, other than the Kent Company, at varying points, fourteen of such samples to be taken from the mains and two from the vicinity of the intakes, and that he do submit the results of analyses of such samples to us."

Mr. LEAN opposed the motion and moved that it be referred back, as it would be a useless expenditure of money.

Mr. Westacott seconded, and ultimately the amendment was carried.

After transacting other business the Council adjourned at half-past seven.

BUILDERS' BENEVOLENT INSTITUTION: ANNUAL DINNER.

THE forty-sixth annual dinner in aid of the funds of this Institution, was held on Thursday, November 23, at Carpenters' Hall, London Wall. Mr. G. E. O. Howard Trollope, the President of the Institution, occupied the chair, and was supported by Mr. J. E. Trollope, Mr. T. F. Rider, Mr. E. B. I'Anson, Mr. G. Burt, Mr. Young, Mr. Bartlett, Mr. Preston (Clerk of the Carpenters' Company), Mr. Randall, Mr. Higgs, Mr. Hall, Mr. T. Stirling, Mr. C. Bussell, and Mr. T. J. Bolding.

The Chairman gave the toast of "Her Majesty the Queen, the Prince and Princess of Wales, and the rest of the Royal Family." The Chairman also gave "The Army, Navy, and Auxiliary Forces," Major Brutton responding for the Army and Navy and Captain Roe for the Auxiliary Forces.

The Chairman, in proposing the toast of the evening, "Success to the Builders' Benevolent Institution," said that the objects of the charity were stated in the annual report, which was sent to every subscriber, and were the granting of pensions to necessitous members of the various branches of the building trades and their widows. Some people might say that they did not see the need for an institution of the sort, but a charity with such a splendid record had no fear of criticism. It had been in existence since 1847, and had since then enabled over 250 persons to spend their later years in comparative comfort, which otherwise would not have been the case. The need for such an institution was emphasised by the fact that the building trade had perhaps more vicissitudes than any other business. In one case a risk might turn out favourably, while in another it might turn out quite the reverse, and the builder might be reckoned by the superficial observer as a fortunate or a stupid man. Unfortunately, from one cause and another, the funds were not in so flourishing a condition as they should like to see them. A great many of the old friends of the Institution had died, while others had not been able to subscribe, for during the last twelve months trade, as they all knew, had been very bad. Altogether they had a good deal to contend with, but he had been able to secure forty-two new subscribers. They had fifty pensioners on the funds, and hoped to be able to add two or three. He was sorry that their old friend, Mr. George Plucknett, was prevented by illness from being with them that evening, and in his absence he would couple the toast with the name of Mr. Thomas Stirling.

Mr. T. Stirling, in replying on behalf of the Institution, expressed the great interest he had always taken in its beneficent operations.

Mr. H. H. Bartlett gave the "Worshipful Company of Carpenters," to whom they were indebted for the use of the hall in which they met, and for substantial donations to the funds of the charity.

Mr. S. W. Preston (clerk of the Company)

replied. The Company, he said, was a very poor one until within the last twelve or fifteen years, but by the wise development of their estate they had not only been able to increase the revenues considerably, but to further the cause of technical education. In conjunction with other City Companies they had lately taken large premises in Great Titchfield-street for holding classes confined to those employed in the building trade, and it would be well if masters would make these known to their employees.

Mr. T. F. Rider proposed "The Chairman and President." The toast was received with acclamation, and the Chairman replied.

The Chairman then proposed "The Architects and Surveyors," without whom, he said, the builder could do very little.

Mr. W. Young, the architect of the Glasgow Municipal Buildings, in responding, spoke of the cordial feeling which should always prevail between the architect and the builder. A great deal had been said in recent days about bad building, and as to their not being up to the aesthetic mark. He maintained, however, that there had never been a time in the history of this country when architects were so much in earnest as at present. In spite of what was said about bad building, if clients would only pay the price they could get as good work, if not better, than had ever been done before.

Mr. H. Northcroft replied for the Surveyors. The remaining toast was that of "The Vice-Presidents, Committee, and Stewards."

In the course of the evening subscriptions and donations to the amount of 909*l.* were announced, of which 616*l.* appeared in the President's list.

Correspondence.

To the Editor of THE BUILDER.

TULLIE HOUSE, CARLISLE.

SIR,—Had your correspondent Mr. Fred. M. Simpson, who was, I believe, formerly an assistant with Mr. C. J. Ferguson, availed himself of the opportunity thus afforded and obtained from his late principal correct information before writing to you, he would have ascertained that the *Times* and other papers were quite correct in stating that the "plans and drawings for the alterations and additions to Tullie House, Carlisle, and the converting of it into a Free Library and School of Art, were prepared by the City Surveyor, Mr. W. Howard-Smith," who was, I would say, appointed by the Corporation of Carlisle in November, 1890, the architect to carry out such works, and whose services in that capacity were recently acknowledged by the Mayor of Carlisle, when proclaiming the buildings open, in the following words:—"I must compliment Mr. Howard-Smith, the Surveyor of Carlisle, for the noble monument which he has erected here to his ability as an architect."

No doubt had Mr. Ferguson had any reason for thinking the *Times* and other papers had in any way mis-stated the facts, he would himself have taken measures to point out any mistake, and not have left such a task to Mr. Simpson.

W. HOWARD-SMITH, City Surveyor.
City Surveyor's Office, Carlisle.

NORWICH CATHEDRAL.

SIR,—Your note in last week's *Builder* with reference to Norwich Cathedral is well timed. The Dean and Chapter after obtaining, some time ago, a report from Mr. Pearson, R.A., have apparently dispensed with his services in supervising the works now going on, and have entrusted them to a young local architect. The chief work seems to be a wholesale chipping off of whitewash with which the whole structure has been long ago most liberally treated, the result being that any appearance of age which may have been present is fast disappearing, and we are making the acquaintance of an apparently brand-new Norman interior.

One has only to refer to Britton to see what mischief has been done in times past in the attempt to get the cathedral up as a perfect Norman Benedictine church. Perpendicular tracery has been removed, and pinnacles have been Normanised, and it is high time indeed that the responsible authorities should disavow such things. Some of the cylindrical features at the angles of the great tower are in cement! The roof is said to be in a bad state, and when these structural defects are remedied there is ample to engage the attention of the Dean and Chapter in providing some adequate amount of dignity to the surroundings of the altar, which at present would hardly do credit to a mediocrity parish church.

NORWICH.

THE L.C.C. AND WATERLOO BRIDGE.

SIR,—Will you allow me to protest against the folly and extravagance of the Engineering (sic) Department in taking up sound and durable granite

paving and substituting deal blocks—a most unsuitable material for the roadway of a stone bridge, whatever may be said of the advisability of using it on an iron structure?

If the excuse is that the unemployed wanted relief, it would have been far better to divide the 2,500*l.* now being wasted, and paid the men to leave the granite alone, for more wanton waste it is difficult to imagine.

In five or six years the wood will be rotten, and, meanwhile, pedestrians will be annoyed with mud and slush from every passing wheel.

Several members of the L.C.C. had the good sense to protest, but in vain, and a word of condemnation in the *Builder* may help to prevent a repetition of the folly.

November 29.

ENGINEERING.

The Student's Column.

GEOLOGY.—XXIII.

WATER-SUPPLY.

THE subject of water-supply was treated at some length in a former series of articles* specially devoted to it, and we make no apology, therefore, for not giving it more prominence in the present course. What we now purpose to do is to give a brief *résumé* in a more or less generalised form.

The two great considerations in regard to the supply of water are (1) its quality, and (2) its quantity. In respect of the first of these, geology is useful only so far as it gives some account of the history of a particular source of water, which history is of material use to the chemist and bacteriologist in enabling them to arrive at some satisfactory conclusion as to its quality. A few words to explain this. We presume the student is aware that the source of all fresh water is the clouds, which have in their turn been formed by the chilling of moisture evaporated from the sea and other large surfaces of water. Rain is theoretically supposed to be pure water, but in reality it is not so. In descending to the ground it takes up minute particles of air, and on arrival it therefore contains air, plus any impurities the latter may have contained. A common method of ascertaining the impurities in the air of any district is to chemically analyse the rain of that district. There is little to complain of in the rain falling in the pure country atmosphere, but the air of towns, especially in manufacturing centres, is not very pure, and the rain suffers accordingly. From this it follows that the bulk of rain-water falling in the country is to all intents and purposes pure. But we never get it on the large scale in the same state as it has fallen. On arrival at the surface of the ground, a part of it sinks in where the soil is absorbent, another part flows away into the nearest rivulet or stream, and a third part is evaporated and returns to the atmosphere. The precise proportions of rain involved in these three operations entirely depend on local circumstances. If the soil is very porous, a large amount rapidly finds its way underground; on the other hand, if the earth is argillaceous, and practically impervious, rivers and streams directly derive a relatively greater quantity. As we are dealing now merely with the question of quality, we need only trace the history of the rain after its arrival, leaving quantity for future discussion.

That portion which sinks into the ground will either be found in superficial beds, or in the solid rock, but in any case the greater part of it, after undergoing a tedious underground journey, will come to the surface again as springs. We have now to ascertain whether its peregrinations have done it any harm. Knowing the geological structure of the district wherein the whole of the operations have been conducted—from the descent of the water as rain, to its emergence as springs—the geologist can frequently furnish an accurate account on this head. If the chief water-bearing bed of that district is calcareous, he will be able to state that during its wanderings the water has taken up a considerable quantity of lime, which will account for its having become what is technically called "hard"; if the beds contain much salt, the water will be brackish; if they are ferruginous, iron will be present; if derived from a superficial bed of peat, the water will be discoloured, and full of finely-divided vegetable matter. It may be said that the chemist could ascertain the presence of lime, iron, salt, &c., in the water without the aid of the geologist, which is perfectly true; but it is important to the water analyst not only to know what the water contains chemically, but how the ingredients got into it. He has then a better opportunity of judging its quality.

In regard to that portion which simply flows over the surface of the land to the nearest rivulet, it may be said that here the question becomes more a part of agricultural or sanitary science than of pure geology or engineering. Nevertheless, the geologist is nearly always called upon to give his opinion in regard to this point also. In reality he has to furnish for engineers and chemists a comprehensive account of the history of the bulk of water found in the stream. It may be stated generally that rain which merely flows over an impervious rock does not get much time to derive anything from it chemically, whether for good or evil. But its mechanical action is such that it obtains much sediment which is discharged into the stream. This sediment may, or may not, be harmful, depending on circumstances. If in a bleak, uncultivated district, the foreign material will not be of much consequence so far as the quality of the water is concerned; if in an agricultural district, on the other hand, the worst results may follow, for deleterious organic matter is tolerably sure to be introduced. The wash of land containing manure, farmyard refuse, &c., could not fail to produce such a result. Then there are districts in which lead works are situated, and where the water is liable to be poisoned by their refuse. Unless legislation has ordained to the contrary, the river may receive the full benefit of discharge from a number of town sewers; and lastly, but not least, the country mansion may add its quota to the filth sent into the stream.

We have this satisfaction, however, that although so many of our rivers are polluted by sewage and other organic matter, the continual movement of the water, whereby aeration is effected, neutralises their baneful results to a large extent by chemically burning up the refuse. The fishes and plants growing in the water also abstract a certain amount of the impurities. Indeed, competent water analysts and medical men have assured us that the contents of a large town sewer may be so energetically treated by the agencies just mentioned in a good-sized river, that an examination of the water a few miles below the point of outfall frequently results in its being found perfectly wholesome. On the other hand, we have equally competent chemists who state that water, having been once polluted by sewage, must always be liable to the gravest suspicion, and that no amount of natural purification can restore it to a perfectly wholesome condition. Be that as it may, we can all agree on one point, namely, that no public or private sewer or effluent water should be permitted to be discharged into any stream, tributary, or river drawn upon for the purposes of water supply. So much for drinking water obtained at the surface of the ground.

Let us now consider the quality of water derived from wells. The latter may be divided into two groups, (1) shallow wells and (2) deep wells. The former class may be illustrated by fig. 1. Here we have a well (x) sunk into a bed of gravel and sand (a) containing a large body of water held up by impervious clay (b). The well may not be more than 12 to 15 ft. in depth. Being so easily constructed, this type has been almost universal, until recent years; but the water it yields is, in the vast majority of cases, fearfully polluted. Such wells are, in general, dug for convenience sake, close to the country dwelling, or in the farmyard, and they have thus become intimately related with the neighbouring cesspools dug also in the same porous stratum of gravel and sand. The result can be better imagined than described.

There is no need, however, to go to the country to furnish examples of the bad effects of shallow wells; they may be culled much nearer home. As an instance, we may quote the circumstances connected with the closing of the well-known "holy well" from which Holywell-street, Strand, took its name. In London, during the cholera epidemic of 1866, the Privy Council gave certain medical men instructions to close the wells in their respective areas, and many were found in the Strand. There was a great struggle, however, between the public and the authorities with reference to the "holy well" referred to, and the inhabitants continued to pump from it until the pipes were taken up. After the latter had been removed, Dr. J. Groves states* that he descended into and examined this well, and actually found a drain emptying into it, which drain, it was subsequently discovered, was in direct communication with a place where cholera stools were thrown. People sent from far and near for water from this "celebrated" well.

* The *Builder*, Vol. LVIII. (1889), July-Dec.

* *Trans. Sanitary Inst.*, Vol. XIII. (1892), p. 269.

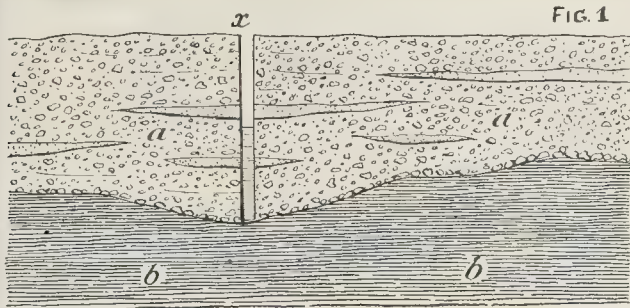


Fig. 1. —Shallow Surface Well.

a—Water-bearing sands and gravels lying on b—A bed of clay, impervious to water.
b—Well dug through a to surface of b.

The case with reference to deep wells, however, is entirely different. When properly constructed, the water yielded by them is very rarely contaminated, unless the source of the water itself is bad. Fig. 2 will serve to illustrate a deep well

FIG. 2.

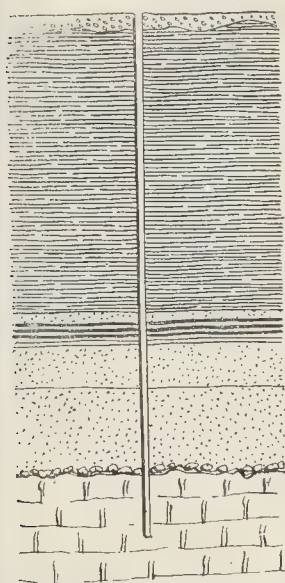


Fig. 2. Deep Well London District.

a—Drift gravel, &c. b—London Clay, c—Woolwich and Reading series, d—Thanet sands, e—Chalk.

sunk in the London district. Here the actual well may only extend downwards partly into the London Clay, the remainder to and into the Chalk being merely bored. Or, the whole well may be carried down into the Chalk. In any case, the contaminated water in the superficial drift deposits is effectually kept out of the well by that portion of it being lined with an iron cylinder prolonged into the London Clay, which is impervious and arrests the downward progress of the impure water. The London Clay itself (from 50 ft. to 250 ft. in thickness, depending on the district in London) is usually devoid of water, but sandy deposits therein have been known to yield a considerable quantity. Assuming the well is made into the Chalk, the London Clay portion is usually merely lined with bricks set in cement, or similarly constructed. On arrival at the pebble and sandy beds at the base of that formation, however, and especially on penetrating the Woolwich and Reading series and Thanet Sands, much water is met with, generally of inferior quality. This is promptly stopped out by lining that portion of the well with iron cylinders of reduced diameter—similar to those used on passing through the drift above. The Chalk is the

best water-bearing stratum in the London district, and the well is carried some distance into it. Such a well, if properly constructed to keep out the contaminated water in the drift and in the loose deposits under the London Clay, should yield nothing but pure Chalk water, rather hard—nevertheless of unquestionable purity.

It may be inquired how the water in beds c and d became contaminated. The answer is simple enough. They used to be the beds from which several private establishments obtained water some years ago. The majority of wells sunk into them, however, were one after the other abandoned, and some were then filled with rubbish, which naturally did not improve the quality of the water. Many let in impurities from above and at the sides, and the sources of contamination increasing, the general body of water in the two formations became, to say the least of it, to be strongly suspected in certain areas. Moreover, the Woolwich and Reading series contains beds of lignite here and there. In some districts under London, however, the water in the Woolwich and Reading and Thanet beds is yet of good quality.

We have not space to multiply examples of this kind, but it may be taken generally that where a deep-seated water-bearing stratum is known to contain good potable water, it seldom or never deteriorates in quality, except by faulty well-construction. Water from deep-seated sources is, as a rule, very pure, having undergone such an efficient filtration in its descent from the surface.

OBITUARY.

MR. W. H. ELLIS.—On the 25th inst. the death took place of Mr. William Henry Ellis, J.P., D.L., which occurred at his residence at Anstey Grange, Leicester. For some time in early life the deceased resided at Beaumont Leys, and afterwards at Newfoundpool. Taking early to commercial pursuits, he became a member of the firm of John Ellis & Sons, cement merchants, and for some years past was head of the firm. He was also senior partner of Ellis, Partridge, & Co., and chairman of the Knighton Junction Brick Company.

"THE GRECIAN HOUSE."—The concluding words of Professor Kerr's speech at the last Institute meeting (page 391 ante) were incorrectly given in our report; the sentence should have run "this plan of the Roman and Greek house was very instructive. The same idea was still carried out by the Spaniards, French, and Italians, to the present day, whereas all the Teutonic nations dissuaded the court entirely as a place of abode, and substituted a covered hall." Professor Kerr had a proof of his speech, but for some reason it was returned too late for correction.

METHODIST CHURCH, BELFAST.—A Methodist church, situated in Duncairn-gardens, Belfast, was dedicated a short time since by the Rev. J. Ernest Clapham, London. The portico of the building is built of stone, the arched entrances having clustered columns and deeply recessed mouldings. These entrances lead to a vestibule, with sliding and swing doors, which communicate with the inner porches. The interior dimensions of the church are 65 ft. long by 50 ft. wide by 36 ft. high in the centre. It is capable of accommodating 800 persons. The ventilation is effected by natural and automatic means, and the heating by Musgrave's small hot tubes. The building contract has been executed by Mr. James Kidd, from the plans, and under the superintendence, of Mr. J. J. Phillips, architect. The total cost of the church and schools is about 5,000l.

GENERAL BUILDING NEWS.

PROPOSED HOSPITAL, WIMBLEDON.—On the 10th ult., Dr. R. Deane Sweeting, one of the Medical Inspectors of the Local Government Board, held an inquiry at the Local Board Offices, Wimbledon, respecting the application of the Local Authority for sanction to borrow 7,000l. for the erection of an isolation hospital, the plans for which have been prepared by the Engineer and Surveyor to the Board, Mr. C. H. Cooper, A.M.Inst.C.E. It is proposed to erect a hospital on an enlargement of the site of the building now used as an isolation hospital, and known as "Durnford Lodge." The buildings proposed are as follows:—(1) Two pavilions containing twelve beds each; (2) one pavilion containing ten beds; (3) administrative block. The pavilions for patients are intended to be enclosed with 14-in. brick walls, carried on concrete arches, and covered with slate roofs. Verandahs are placed alongside each pavilion, under the shelter of which convalescents can take air, and, if desired, provision is made for patients in bed to be wheeled from wards under these verandahs, a system which has met with marked success in Berlin. The wards are in pairs for male and female patients, separated by a nurse's duty room, which there are fixed windows for overlooking each ward. The wards are lighted by windows on opposite sides, arranged so as to act as ventilators. Each ward can be heated by a stove, and has a water-closet, and in the case of the large wards, a slop-sink attached, which, so far as ventilation is concerned, is cut off by a vestibule. In each of the two pavilions, which, in addition to the ward, a bath-room is placed, which acts also as a discharging room, the patients entering by an internal door and leaving by one opening direct into the outer air. Each nurse's duty-room is fitted with a stove, slop-sink, &c. The minimum cubic space allowed per bed is 2,028 cubic ft., and the minimum floor area per bed is 150 sq. sup. The pavilion containing small wards, i.e., two three-bed and two two-bed wards, with two nurses' duty-rooms, is intended for the reception of doubtful cases, patients requiring a private room, and those attacked with diseases of more or less rare occurrence. The administrative block is designed to accommodate eight nurses, nine servants, and one matron. The ground floor contains waiting-room, medical officer's room, servants' mess-room, nurses' sitting-room, matron's sitting-room, pantry and kitchen, with stores, larder, and detached water-closet. The first floor contains matron's sleeping-room, four nurses' sleeping-rooms, one leading servants' ditto, dormitory for four servants, with linen store, two bath-rooms, and two water-closets. The second floor contains three rooms for four night nurses, and dormitory for four servants.

TECHNICAL SCHOOL, BIRMINGHAM.—On the 18th ult., the Right Hon. A. H. D. Acland, M.P., laid the foundation stone of the new Municipal Technical School, Birmingham. The chief frontage of the building will be in Suffolk-street. The architects of the building are Messrs. Essex, Nicol & Goodman, who were selected in competition, and the tender of Messrs. Sapote & Sons was accepted for the work at a cost of 47,489l. The sub-basement is placed at a level of 25 ft. below the pavement in Suffolk-street, and will contain the engine-rooms (60 ft. by 30 ft.), in which will be placed the gas-engines to drive the ventilating fans and the necessary engines for generating electricity for lighting and motive power; also the foundry and stamping shop (about 45 ft. by 38 ft.). The remainder of the sub-basement is arranged to contain the heating apparatus. On the basement floor the principal departments surround an internal area 100 ft. by 47 ft. for light and ventilation. The iron and steel shop, which is first entered on emerging from the engine-rooms, will be an apartment 60 ft. by 45 ft. Adjoining it will be the iron and steel stores, and in a detached building in the courtyard is a pattern-maker's room. Passing into the west staircase, which adjoins in the main corridor, is the lecture room in connexion with the metallurgical department, the site of which is 45 ft. by 34 ft., next to which are the preparation rooms and stores. In the main corridor are the brass shops and metal-plate plumbing shops. The mechanical laboratory will contain the testing machines and other mechanical appliances, adjoining which is the practical lecture-room and preparation room. On the lower ground floor are the metallurgical laboratory and the balance room, and a room for metallurgical stores. The remainder of this floor on the front wing towards Suffolk-street is the laboratory for electro-metallurgy and brazing, the practical lecture room, preparation room, battery room, and dynamo room, and on the east wing the carpenter's shop and a suite of rooms connected with the metallurgical department, consisting of two practical lecture rooms and the metallurgical museum. The ground-floor is entered from Suffolk-street by an entrance which communicates with the west staircase, and is also connected with the east staircase by a corridor 9 ft. wide, which is repeated on every floor of the building. The principal room on this floor is the assembly hall and examination room. In the front wing on this floor is placed the suite of administrative offices, consisting of secretary's office, clerks' room, principal's room, and committee room, and in the back wing two large lecture rooms students' common

room, teachers' room, and room for the principal of the metallurgical department. Adjoining the entrance is the curator's office, which communicates with his residence. The first floor contains rooms devoted to physics and chemistry. The suite of rooms for applied physics is placed in the back wing, and includes a lecture room for electrical engineering and telegraphy, laboratory, battery room, dynamo room, photometry room, and workshop; also having a private room for the principal in the chemistry and physics department. The second floor is devoted to class rooms for the women's department, and a large drawing class room for geometry, and a lecture room and museum for geology and botany, which covers an area of about 50 ft. by 45 ft. There are other rooms on this floor for the use of the teachers and retiring room for women. In a mezzanine, occupying a portion of the centre block, are the chemistry and sanitary science museums. The third floor is almost entirely devoted to chemistry. The mechanical drawing room is also placed in the south-east part of this floor. The structure is a brick and terra-cotta building. The terra-cotta selected is buff in colour. The building is Renaissance in style.

QUEEN'S HALL, LANGHAM PLACE.—This new concert hall, of which the plan and interior and exterior views, with a description, were published in the *Builder* for February 14, 1891, has just been completed. The contractor was Mr. Charles Wall of Chelsea, and special works were carried out by Messrs. Doulton, (Quillet of Paris), Campbell, Smith, & Co., and others. Messrs. Sidney W. Elmes & Son executed the exterior carving. The furnishing was done by Messrs. Lapworth Brothers & Harrison. The design was published in our pages as that of Mr. C. E. Knightley; we have received a letter claiming it for Mr. C. J. Phipps, and stating that the rival claims had been referred to the President of the Institute for his decision.

CATHOLIC CHURCH, COVENTRY.—On the 21st ult. the new Catholic Church, Raglan-street, Coventry, was opened. The church, which is dedicated to St. Mary, is in the Early English style, and consists of nave, chancel, Lady Chapel, baptistry, entrance porch, vestibule, and an organ gallery running the entire width of the church at the western end, and two sacristies situated between the church and presbytery. The buildings are of brick, with Bath stone dressings, and the roof is slated with ornamental red ridges. The chancel and nave inside have a barrel roof of pitch pine. The chancel is of apsidal form, and contains four stone arches, two on either side with marble columns and carved stone capitals opening into the Lady Chapel and nave chantry respectively. The nave floor is of oak blocks in the aisles with raised wooden platforms under the bench spaces. The side walls of the nave are of moulded stone arches forming recesses which receive the traceried stone windows filled with ornamental leaded lights of tinted glass in geometrical designs. The chancel floor and altar steps are of marble and encaustic tiles. The chancel is lighted by recessed, trefoil headed, couplet windows, supported on marble shafts with carved capitals. The large arch at the back of the altar is filled with a sculptured subject representing the crowning of the Blessed Virgin, which forms the principal part of the reredos, and this together with the altar and tabernacle, and the buildings, as well as the altar and reredos, are from the designs of Mr. T. Richmond Donnelly, architect, of Coventry. Mr. C. Gray Hill was the builder. The hot-water apparatus was supplied by Mr. Pearson, of Coventry.

SCHOOL-CHURCH, LEVENSHULME, LANCASHIRE.—On the 2nd ult. the new school-church erected in Barlow-lane, dedicated to St. Mark, and in connexion with the parish church of St. Peter, Levenshulme, was opened. The building is of brick, and for purposes of worship seats are provided for 300 worshippers. The building has been erected by Messrs. Bullivant & Son, Newton Heath, from plans by Mr. J. H. Maybury, architect.

PROPOSED ENLARGEMENT OF ST. AGNES'S CHURCH, BIRCH, LANCASHIRE.—At a special vestry meeting of the parishioners of St. Agnes's Church, Longsight, on the 24th ult., it was resolved that the plans of the addition of a new north aisle affording accommodation for 200 more worshippers, prepared and submitted by Mr. Medland Taylor, architect, Manchester, be approved. The proposed enlargement will involve an outlay of about 1,000l.

CHURCH, NEW TREDEGAR.—The Bishop of Llandaff consecrated, a short time since, the new church dedicated to St. Dingat at New Tredegar. The total cost of the new church is 2,250l., and it will accommodate a congregation of 400. The building is Early Gothic in style and is built in local stone, with buff terra-cotta dressings, with roofs of red deal. Messrs. Seddon & Carter (Cardiff) were joint architects with Messrs. James & Morgan (Cardiff), the design being by Mr. Carter, and the erection superintended by Mr. Morgan. Messrs. Williams & Son, of Trelefon, Talgarth, were the builders.

MODEL LODGING HOUSE, LEITH.—The memorial stone of a model lodging-house which the Corporation of Leith is having erected on the Improvement Scheme area, recently unveiled by Mr. James Simpson, and Mr. James Kinneir is the builder. The lodging-house is to cost about 4,000l.

RESTORATION OF THE OLD CASTLE OF DALCROSS.—According to the *Scottishman*, it is proposed to restore the old castle of Dalcross to its former state. The castle was originally built in 1520 by Simon, eighth Lord Lovat, and after passing through various vicissitudes and several bands, was purchased by The Mackintosh in 1702. It is still in a wonderful state of preservation, its stanchioned windows, oaken door, hall, and kitchen, having withstood the ravages of time. "The ceiling of the hall," says Mr. George Anderson, writing in 1863, "is of fine carved oak, in part rudely painted; but its most interesting feature is the dais, or portion of the floor raised above the rest, for the special use of the lord of the manor, his family, and principal guests. The roof of one of the bedrooms was painted all over with the coats of arms of the principal families in the country, and those of Robert Bruce, of the Marquis of Huntly, Marischal, and Stuart, are still quite distinct." Mr. W. L. Carruthers, architect, Inverness, is at present engaged in preparing plans.

CHURCH, ABBEYDALE, SHEFFIELD.—On the 16th ult. the Duchess of Portland laid the foundation stone of the new Church of St. Peter, Abbeydale. The church is designed to accommodate about 800 people. The ground falls rapidly from west to east, and advantage has been taken of this to provide in the basement a large room for parochial purposes. This room is in addition to vestries for the ministers and choir in the east end of the church. The church itself consists of a nave, 97 ft. long and 26 ft. wide, north and south aisles, with outer and inner porches at the west end of each aisle, the baptistry being in a projecting bay between the porches. The chancel is 40 ft. long, with a chapel 25 ft. by 15 ft. on the north side, and an organ chamber of similar dimensions on the south. The height of the edifice from floor to ridge is 55 ft. Local stone has been used for the walls and dressings, bath stone for the nave, arcade, and chancel arches, and the roof will be covered with green Westmoreland slates. The architect is Mr. Joseph Norton, Sheffield, whose plans were selected in an open competition, Mr. Evan Christian being the assessor; Mr. L. T. Wildgoose, of Mallock Bank, is the contractor; and Mr. William Parnell, of Manchester, is clerk of the works.

NEW SCHOOLS, ST. LUKE'S CHURCH, WOLVERHAMPTON.—The memorial-stone was laid recently of the new schools in connexion with St. Luke's Church, Blakenhall. The new building, which adjoins the present schools, is intended to serve as a boys' school, and will accommodate about 120 scholars. Inside it will measure 70 ft. by 22 ft. The builder is Mr. H. Gough, of Wolverhampton, and the architect is Mr. F. T. Heslop.

ALTERATIONS, BAPTIST CHAPEL, SALENDINE NOOK, YORKSHIRE.—Alterations to the Baptist Chapel, Salendine Nook, have just been completed. They embrace a new porch and vestibule, the reseating of the body and gallery of the chapel, the construction of an external staircase for the choir, and the provision within the shell of the old building of a series of rooms for the minister, the deacons, and others. The alterations and improvements are estimated to cost 3,500l., and they have been carried out under the superintendence of Mr. B. Stocks, architect, Huddersfield.

CONGREGATIONAL CHURCH, MIDDLESBROUGH.—On the 20th ult. the foundation-stones of a new Congregational church at Middlesbrough were laid. The church will be cruciform in shape, with nave, aisles, double-gabled transepts and choirs. The architect is Mr. J. Mitchell Bottomley, of Middlesbrough and Leeds, and the contractors are Mr. John Johnson, Middlesbrough, and Mr. R. Snaith, Darlington. The total cost of the new church and premises for school, clubs, and other departments, is 7,500l.

ESTABLISHED CHURCH, TITWOOD, N.B.—The memorial stone of the Titwood Established Church was laid on the 18th ult. The church, which is estimated to cost 8,500l., is cruciform in plan, and is being erected on a site at the corner of Glencairn Drive and Leslie-road. The principal entrance will be through a porch on the north front, and additional doors for exit will be provided at the south and east of the church. The nave seating will be entirely within the side aisle piers; a gallery will be placed in the north transept and also at the end of the nave, the pulpit being placed at one side of the entrance to the chancel, and the font on the other side. The organ will be divided, and occupy two arched recesses on each side of the chancel. The nave will be lighted from the clerestory windows, there being no windows in the aisle piers. The clerestory and the large west windows will be divided by mullions into three and six lights respectively, and have the upper parts filled with varied forms of tracery. The interior walling is to be finished with stone. The roof will be a pointed arch, lined with wood, and having rib mouldings at intervals between the main cupples. Accommodation will be provided for over 1,000 sittings in the church, and a hall, session-house, vestry, ladies' room, &c., will be arranged to the east of the church. The style is fifteenth-century Gothic. It is intended at some future time to erect a tower in continuation of the north porch, and the walls and foundation there have been built with a view to this.

The contractors are—Mason and joiner work, Alexander Edie & Son; plumbing work, W. Hendry & Son; plaster work, A. Calder & Son; and heating and ventilation, J. Boyd & Son. The entire work is being carried out under the superintendence of the architect, Mr. H. E. Clifford, I.A., Glasgow.

POST OFFICE, HELENSBURGH, DUMBARTON.—On the 20th ult. a new Post Office was opened at Helensburgh. The building is a two-story central site at the corner of Colquhoun-square and Princes-street, with a frontage to the former of 46 ft. and to the latter of 78 ft. It consists of two stories, and the exterior elevations are in the Classic style. The dome and cupola on the circular corner of the building is a conspicuous feature. The freestone used was brought from Giffnock Quarry. On the ground floor is situated the public office, 20 ft. by 20 ft., which is entered by a porch with two doorways. Entering from this office are the postmaster's room and the telegraph instrument room. The sorting-room occupies the western side of the ground floor. On the second story are three rooms. The cost of the new building was about 5,000l. It was designed by H.M. Robertson, Surveyor for Scotland to H.M. Office of Works, Edinburgh. The contractor for the whole of the works was Mr. Alexander Miller, builder, Helensburgh; and the sub-contractors were Mr. John Dick, joiner; Mr. John Horner, plumber; Messrs. J. & W. Bain, smiths; Mr. William Gartshore, plasterer; Messrs. W. Thom & Son, slaters; Messrs. J. W. McCulloch & Son, painters; and Messrs. J. C. Malloch, glaziers. The work was under the superintendence of Mr. James A. Kennedy.

STAINED GLASS AND DECORATION.

MEMORIAL WINDOW, LANIVET CHURCH, BODMIN.—A memorial window has just been placed in the parish church of Lanivet. It is of three lights and tracery in Perpendicular style. Three single figures of Abraham, Rebekah, and Daniel, occupy the greater portion of the main lights, and beneath them three subjects of scenes from their lives. In the tracery are angels bearing emblems. The work has been executed by Fouracre & Son, of Stonehouse, Plymouth.

THE LOWELL MEMORIAL IN WESTMINSTER ABBEY.—Mr. Leslie Stephen unveiled, on Tuesday, the memorial which has been placed in honour of the late James Russell Lowell at the entrance to the choir of Westminster Abbey. The memorial includes a window and a bust underneath. The window has been erected by Messrs. Clayton & Bell, and consists of three lights. In the centre is the figure of Sir Launfal, from Lowell's poem of that name, below is an angel with the Holy Grail, and in the lowest compartment the incident of Sir Launfal and the leper is represented. The right light has the figure of St. Botolph, the patron saint of the church at Boston, Lincolnshire, from which the Massachusetts city, Lowell's birthplace, derived its name; below is the landing of the Pilgrim Fathers. The light on the left contains the figure of St. Ambrose, below is a group representing the emancipation of slaves. In trefoils above the side-lights are shields bearing the arms of the United States and the United Kingdom.

FOREIGN AND COLONIAL.

FRANCE.—M. Lucien Magne has recommenced at the Ecole des Beaux-Arts his course of lectures on "The History of Architecture"; and M. Baudot has commenced, at the Trocadéro Museum, a course on "French Medieval Architecture."—The Minister of Fine Arts has put at the disposition of M. Henri Cros, the sculptor, a studio at the Sévres manufactory, where he can pursue some investigations in regard to the treatment of coloured glazed ware.—M. Louis Bonnier has obtained the first prize in the competition for Ivory Municipal Buildings.—There is talk of a subscription being opened for the erection of a monument to Marshal McMahon.—The competition at Bordeaux for the Girardin monument had been announced as awarded to M. Esquié (architect) in collaboration with M. Labattut (sculptor). Much surprise has therefore been caused by the announcement that the Municipality have changed their minds and awarded it to M. Dumilâtre and M. Rich. M. Daumet, as president of the Société Centrale, has protested energetically against this breach of faith with the first-named competitors.—M. Peynot, the sculptor, has finished the monument to be erected at Lyons to the Republic, and part of the work is already in place.—A new hospital for aged men has been opened at Pantin, intended especially for the communes of the north-east of Paris.—The statue of Chevreul at Angers will be inaugurated on Sunday week, December 9.—M. Henri Meunier, architect, of Lille, has died at the age of sixty-eight. He was born at Armentières and was a pupil of the Ecole Académique de Lille.—The Museum of Rouen has just received a statue by M. Gerôme, "La Douleur," as well as a military picture by Protais, and a series of drawings by Hippolyte Bellanger and Renouard; and Baron

Rothschild has given to the same museum a set of medals by M. Chaplain, including portraits of MM. Gerôme, Bonnat, and Meissonier.

Many of the artists who exhibit at the *Chaplain de Mars Salon* are anxious as to what will become of the exhibition room in the Palais des Beaux-Arts when the 1900 exhibition is to be prepared. The treasurer of the "Société Nationale des Beaux-Arts," M. Dubufe, has stated through the Press that his society had acquired the right to occupy those galleries for its exhibition until 1898. They have already prepared plans for other and more suitable galleries after that date.

MISCELLANEOUS

ANNUAL DINNER, CARDIFF MASTER BUILDERS' ASSOCIATION.—The Cardiff Master Builders' Association held its fifth annual dinner at the Angel Hotel on the 22nd ult. There were about 230 present, over whom Alderman David Jones (President) presided. The President having proposed the loyal toasts, Mr. W. Geen submitted "The Army, Navy, and Reserve Forces," to which Captain Bruce Vaughan responded. Mr. J. Strachan proposed the toast, "The Architects and Engineers," to which Mr. J. Strachan responded. Messrs. Edwin Seward and S. Rooney replied. Mr. Seward mentioned that the South Wales Association of Architects had been directly allied to the Royal Institute, and examinations would be held in Cardiff. He pointed out that there was necessity for some arrangement for the training of architects and plasterers for an increase in the number of apprentices if those trades were to maintain their necessary strength. Mr. F. H. Lock then, on behalf of the Association, presented to the President a casket, containing an illuminated address, on his retirement from the more active duties of business. The address expressed the high esteem in which Alderman David Jones was held, not only by the Association, but by the general community of Cardiff. The President thanked the members for the kindness which they had shown him that evening and on all occasions in connexion with the Association. Other toasts followed.

OAK TRIPTYCH, OLD ST. PAUL'S CHURCH, EDINBURGH.—On the 19th ult., in Old St. Paul's Church, Jeffrey-street, Edinburgh, Bishop Dowden dedicated the new triptych which has just been erected over the altar table. It is the gift of Miss Cranston, of Waverley Park, and is of Gothic design, decorated with carved niches and foliated cornices, and crocketed finials. There are also in the various niches and on the pinnacles carved figures of various saints, numbering forty-one in all, and so arranged as to have reference to the subjects selected for treatment—"Christus Propheta," "Christus Sacerdos," "Christus Rex," "Christus Salvator." Immediately over the re-table is a cornice enriched with small niches containing the twelve Apostles with their emblems. In the large central space is to be placed a painting copied from the "Holy Child Jesus with Madonna Enthroned," by "Benvenuto da Siena," in the National Gallery, London. The two side wings of the triptych are divided from the centre panel by a series of canopies and niches, with the sculptured figures already mentioned. At about 20 ft. from the floor the whole is surmounted by a cresting of various designs, the centre being surmounted by shields bearing the emblems of the Passion. The two wings or doors of the triptych are hinged so as to fold over and enclose the centre. They are decorated with diaper work in gold and colours. Two spirals of finials rise over the canopied piers to a height of about 26 ft. above the chancel floor, the shafts across the extended wings being 10 ft. Most of the work has been laid with gold leaf, the hollows only being picked out in dark red. The figures and the carved "Pietà" panel are the work of Sebastian Zwink, of Oberammergau. All the rest of the work, including the angels holding scrolls, is by Mr. John Gibson, wood carver, and the gilding and colouring is by Doig & McKeechie. The whole of the work has been executed from designs and full-sized drawings prepared by the architect, Messrs. Hay & Henderson, Edinburgh.

REBUILT AT PETERBOROUGH CATHEDRAL.—The family of the late Dean Saunders is about to erect a reared to his memory in Peterborough Cathedral. Mr. Pearson, R.A., and according to the *Bristol Times and Mirror*, will harmonise with the cathedral. At the four corners of an alabaster canopy there will be figures representing the Four Evangelists. The figure at the eastern end will be that of St. Peter, the patron saint of the Cathedral. The work has been carried out by R. Davidson, of London.—An Aberdeen granite memorial to the late Mr. H. P. Gates has just been completed in the cemetery attached to the Cathedral. The memorial has been executed by Mr. J. Thompson, of Peterborough. Mr. Ruddle supplying the design.

MEASURING TILING.—A correspondent writes to ask "whether we are entitled in measuring tiling to take 6 in. for cutting (or putting out) eaves in addition to the usual allowance for cutting, namely, 8 in." The practice in the measurement of roof-tiling is, according to the text-books (e.g., Hurst and Laxton), to allow an extra 4 in. in width for ordinary eaves, 6 in. for dripping eaves, 3 in. for raking cutting. London surveyors usually measure 6 in.

extra for all eaves to begin with, and an extra 3 in. where there is a raking edge—in the case, for example, of a lead or zinc gutter between two internal slopes. In some parts of the country as much as 12 in. extra is allowed for all eaves.

DRAINAGE OF SOUTHWOLD, SUFFOLK.—Colonel C. H. Luard, R.E., one of the inspectors of the Local Government Board, held an inquiry at the Town-hall, Southwold, on the 24th ult., for the purpose of taking evidence in respect of the application by the Town Council for a loan of 5,000l. to carry out the scheme of Mr. Frederick Beesley, C.E., of Westminster, for the drainage of the town.

THE ART UNION OF LONDON.—We have received an impression of the presentation plate to subscribers this year, an etching by Mr. Macbeth, of Mr. H. W. Davis's "Summer Time"; a good reproduction of a fine work.

LEGAL.

A QUESTION OF DRAINAGE.

In the Chancery Division on Thursday, November 23, judgment was given by Mr. Justice Romer in the case of *Stretton's Derby Brewery Company (Limited) v. the Mayor and Corporation of Derby*, it being an action for an injunction by the plaintiffs, the owners and occupiers of a brewery abutting on Ashbourne-road, in the borough of Derby, against the defendants, the Corporation of Derby, acting by the Town Council, as the Urban Sanitary Authority of the borough.

It appeared that many years ago, in exercise of their statutory duties, the defendants provided a system of drainage for the district, and as part of that system made the sewer that passes under the road in which the plaintiffs' brewery was situated. The brewery was erected some years after the sewer was made, part being built in 1869, and other parts in 1876, 1880, and 1881. As the different parts of the brewery were erected, the owners for the time being exercised their statutory rights and drained them into the sewer by communications which had to be, and were, first approved of by the defendants. These communications respectively ran to the sewer from the floors of the cellars of the several parts of the brewery, which floors were slightly above the crown of the sewer, so that the cellars could not be flooded from the sewer until the sewer got filled and a pressure was caused in it, which forced the contents of the sewer up the communications through the floors of the cellars. On June 25, 1891, a heavy storm occurred which blocked the sewer and drove the sewage up the plaintiffs' communications to their cellars, and flooded the cellars for a short time for a depth of about 3 ft., and, after the flood retired, left some inches or so of sewage matter on the floors of the cellars. This caused damage to the plaintiffs, and they complained to the defendants. In May and June other floodings occurred, and the plaintiffs made further complaint of the damage they had sustained. The action was commenced in August, 1892, and another flooding occurred in July, 1893. The learned judge found in making their existing system of drainage, and in constructing the sewer, the defendants had exercised due care and were not guilty of negligence. He found that when the communications between the brewery and the sewer were made, and for some years afterwards, the sewer was well constructed and sufficient for the purposes of draining the district, and could cause no flooding, or probability of flooding, to the brewery. It was also established that the floodings did not arise from any want of repair in the defendants' sewer.

Mr. Justice Romer, in giving judgment, found that the defendants, up to the time when the action was commenced, or up to the date of the trial, were not guilty of negligence or of want of reasonable care and diligence in maintaining the existing sewer, and in not providing a new sewer or system of drainage, and that therefore they could not be held liable under Section 19 of the Public Health Act, 1875.

The action, therefore, was dismissed with costs.

MEETINGS.

SATURDAY, DECEMBER 1.

Institution of Civil Engineers (Students' Meeting).—Mr. Leonard H. Appleby on "Forms of Tensile Test Pieces." 7.30 p.m.

MONDAY, DECEMBER 4.

Royal Institute of British Architects.—General Meeting (Business) for members only. 8 p.m.

Surveyors' Institution.—Mr. R. Godfrey on "The Local Government Bill, 1893." 8 p.m.

Society of Engineers.—Mr. Perry F. Nursey on "Some Practical Examples of Blasting." 7.30 p.m.

London Institution.—Lecture by Professor C. V. Boys entitled "When and Why an Electric Spark Oscillates." 8 p.m.

Liverpool Architectural Society.—A Series of Lantern Slides, illustrative of English and Continental Architecture, to be exhibited by Mr. G. E. Thompson. 6.30 p.m.

Leeds and Yorkshire Architectural Society.—Professor Goodman on "Testing Materials"—a practical demonstration. 7.30 p.m.

Society of Arts (Cantor Lectures).—"The Art of Book and Newspaper Illustration," by Mr. Henry Blackburn: II. 8 p.m.

TUESDAY, DECEMBER 5.

Institution of Civil Engineers.—Resumed Discussion upon the papers on "Impounding Reservoirs in India, and the Design of Masonry Dams," by Mr. Clerke, Mr. Sadayappan, Colonel Jacob, and Professor Kreuter. 8 p.m.

Society of Biblical Archaeology.—8 p.m.

Glasgow Architectural Association.—Mr. A. N. Paterson on "Planning of Hospitals." 8 p.m.

WEDNESDAY, DECEMBER 6.

South Kensington Museum (Lecture Hall).—Lectures on "Greek Sculpture," by Miss E. Sellers: III. "Skopas." 5 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting. 8.30 p.m.

Liverpool Engineering Society.—Mr. F. M. Evanson on "Water-Saving Machinery." 8 p.m.

Institution of Civil Engineers of Ireland (Dublin).—Meeting to be held at 35, Dawson-street.

Royal Archaeological Institute of Great Britain and Ireland.—(1) Mr. Talford Ely, M.A., F.S.A., on "Athena and Enceladus as Represented on a Greek Vase"; (2) Mr. J. H. Round, M.A., on "The Introduction of Archaic Bearings into England." 4 p.m.

British Archaeological Association.—(1) Mr. J. T. Irvine on "Discovery of Part of the Saxon Abbey Church, Peterborough"; (2) Dr. Russell Forbes on "The Excavation of the Stadium on the Palatine Rome." 8 p.m.

Society of Arts.—Mr. Frederic Villiers on "An Artist's View of Chicago and the World's Fair." 8 p.m.

THURSDAY, DECEMBER 7.

University College.—Lectures on Greek Sculpture: "Pheidias to Lysippus," by Professor Percy Gardner. VI. "Lysippus." 5 p.m.

Society of Antiquaries.—8.30 p.m.

FRIDAY, DECEMBER 8.

Architectural Association. Mr. Owen Fleming on "The Inefficiency of the Modern Workman." 7.30 p.m.

Sanitary Institute (Lectures on the Sanitation of Industries and Occupations).—Professor T. Oliver on "Metallic Poisons, Lead and Arsenic." 8 p.m.

Junior Engineering Society.—Mr. S. Cutler, Jun., on "Coal-Gas Manufacture and Recent Improvements of the Plant employed therein." 8 p.m.

Institution of Civil Engineers.—Students' Visit to inspect the Cask-making Machinery at Messrs. A. Ransome & Co.'s Works, King's-rd., Chelsea. 2.30 p.m.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

20,271.—**SLIDING WINDOWS:** *John Lunney and Thomas Lindsay.* This invention consists in the special construction of the meeting faces of the sash and hanging slides, which are formed of plates of metal, shaped to form rebate or weather-guards, by locking together, such metal plates also altogether obviating sticking from moisture, and allowing complete and easy reversal of the sashes, which are secured by special latches when closed.

23,177.—**EARTHENWARE SANITARY PIPES, &c.:** *Reginald Stanley.* This invention relates to an improved machine for manufacturing such pipes by moulding, and especially for the supply of a stream of plastic clay to the mould to form the sockets by suitable dies.

23,536.—**DOMESTIC FIRE-GRATES:** *William Allardice.* The object of this invention is to ensure the consumption of smoke and gases arising from newly-added fuel, which is effected by making the grate in the shape of a box, mounted in the sides of the stove, so as to be capable of rotation. When fresh fuel is added, a half-turn is given by a lever, and the freshly-added fuel, being brought to the bottom of the grate, has to send its products of combustion through the incandescent fuel then above it.

17,538.—**SYPHON FLUSHING CISTERNS:** *Johann D. Mader.* This invention relates to flushing cisterns for water-closets, &c., in which a bell siphon is provided in the cistern. It is arranged by passing through the bottom thereof, the said cistern being provided with an exteriorly-pivoted arm and float.

16,237.—**BRICK-MAKING MACHINES:** *Samuel E. Haskin.* In a machine of the rotary type the compression-wheel is, according to this invention, converted into another mould-wheel so that two (or two) are formed simultaneously. This obviates the formation of pencils or rolls of clay by the impact of an inflexible pressure-wheel.

17,548.—**THIN PLASTER OR GYPSUM WALLS:** *Theodor Lehmann.* This invention relates to forming thin partition walls without wood or metal lattice-work for foundation or support. Grooves are cut in the opposite walls of the room, and the door-frame supported in its proper position. Boarding is then temporarily fixed in the grooves, the plaster or cement built up against this, and the boarding then removed. Floor-cement, with stucco-plaster and sand, is the best material. Walls of 12 ft. in height can thus be built.

NEW APPLICATIONS FOR LETTERS PATENT.

NOVEMBER 13.—21,561, T. Houghton, Jash-fastener.—21,562, J. Houghton, Joint to Meeting Rails of Sashes.—21,567, G. Newman, Door-closing Springs and Checks.—21,543, The Patent Victoria Stone Company, Limited, and J. Phillips, Gully Catch-pits and Traps.

NOVEMBER 14.—21,688, T. Groggie, Window Sashes.—21,728, A. Bridgman and G. Halse, Saw Benches and Sawing Machines.

NOVEMBER 15.—23,753, D. Kirk, Chipper Blocks for Wood Moulding Machinery.—21,795, W. Young, Hanging Window Sashes.—21,799, G. Gray and C. Batstone, Constructing Window Sashes.—21,801, J. & W. Horsfall, Window Draught-excluder, Burglar Proof, and Prevention of Rattling in Stormy Weather.—21,841, M. Smith, Ceiling Decoration.

Do, 2nd	0/13	0/12 6		
Other qualities	0/13	0/10		
Cedilla, do. do.	1/1	1/1		
Honduras, do. do.	1/1	1/1		
Mahogany, Cuba	1/4	1/4		
St Domingo, do. do.	1/4	1/4		
cargo av.	1/3	1/6		
Mexican do. do.	1/3	1/4		
Tobacco, do. do.	1/1	1/1		
Honduras do. do.	1/1	1/1		
Box, Turkey ton	0/6	13/10		
Rose, Rio	8/10	20/10		
Bahia	7/10	18/10		
Satin, St. Do.	0/16	0/12		
Lacewood			10/10	20/12
Coconut, Cochun			25/10	0/10
Do. Ceylon			77/10	0/10
Palm, Lagos			16/10	0/10
Rapeseed, English				
pale			29/10	23/10
Cottonseed, do.			21/10	23/10
Oleine			22/10	24/10
Lubricating, U.S.			4/10	5/10
Do. refined			5/10	13/10
TAK - Stockholm				
Archangel, bars			0/15	0/10
Do. do.			0/15	0/10

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursdays.]

BRADFORD (York).—Accepted for the extension of a combined, Tong, Mr. T. Barker, architect, 5, Bond-street, Bradford. Quantities by the architect—

Mason, C. G. Dixon, Birkenshaw	£2,300 0 0
General—Toothill & Balfour, Bradford	386 20 0
Foundry—Whitehead Bros., Farsley	450 0 0
Water—T. Thompson, Stanningley	295 0 0
Plumbers—J. Booth & Son, Dudley-hill, Bradford	223 10 0
Plaster—T. Bolton, Bradford	125 0 0
Painter—T. Marshall, Bradford	90 0 0
Gates and Ladders—J. Bagnall & Son, Halifax	54 0 0
Stone Laying—Marston & Co., Heckmondwike	7,300 0 0

BRISTOL.—For underdraining a portion of Canford Farm, Westbury-on-Trym, together with outfall, &c., for the Barton Regis Union Sanitary Authority. Mr. A. P. J. Cottrell, C.E., Lonsdale Chambers, Baldwin's-square, Bristol.

W. H. Smith	£950 0 0
W. F. Green	£738 0 0
W. H. Smith	750 15 0
F. K. Martin, St. Paul's	751 0 0
George S. Bristol	637 0 0

* Accepted.

[Engineer's estimate, £798.]

CASTLEFORD (Yorks).—Accepted for the erection of school buildings, cookery, and laundry centres, Webb-street, for the school Board. Mr. Arthur Hartley, architect, Carlton-chambers, Leeds. Quantities by Mr. W. Huffman Wood, Park-square, Leeds—

Decorators, Bricklayers, and Masons—Watson & Elsworth, South Milford, Yorks.	£2,850 0 0
Carpenters and Joiners—David Terry & Son, Hightown, Castleford	1,340 10 0
Tray Brothers—George Burns, North Easington, Castleford	120 0 0
Slater—Samuel Jackson, Pontefract-road, Castleford	131 0 0
Plumber and Glazier—Richard Nicholson, Harewood, Castleford	490 0 0
Painter—J. Foster, Hightown, Castleford	721 5 0

CROMER (Norfolk).—For sea wall and esplanade for the former Protection Commissioners. Mr. H. Melliss, engineer, 239, Levis & Melrose, F.C.—

Levis & Melrose	£2,400 0 0
Double	1,920 0 0
Yellow & Son	1,920 0 0
John Neave	2,775 0 0
Ball	2,012 0 0
Co. & Batters	1,958 0 0
Bardell	1,523 0 0

* Accepted.

DEWSBURY.—For the erection of an electric lighting station, too high chimney, for the Corporation. Mr. Henry C. Marks, architect, 10, St. James's-street, Dewsbury—

E. Johnson	£2,150 14 0
Ed. Chadwick & Son	3,562 0 0
William Scott & Son	3,432 9 2
Ben. Graham & Son	3,473 4 0
Robt. & Denton	3,675 18 0
Mark Scott, Earls-Street, near Sons	3,674 11 2
Dewsbury	3,418 4 4

* Accepted.

DORCHESTER.—Accepted for the erection and completion of out cottages, Bell-street, Dorchester. Mr. A. L. T. Tilley, civil, & Cornhill, Dorchester—

Tilley & Williams, Dorchester

GRAYS (Essex).—For the supply of 500 or 1,000 tons of granite or granite, for the Grays Thorough Local Board. Mr. A. L. James, surveyor, Local Board Office, Grays Thorough—

		Per ton.
Mundy & Co.	Belgian	9 8
Griffin & Son	West of England	10 0
Ed. Kilduff Trading Company ..	Mountsorrel	13 11
A. & F. Manuelle	Guernsey	12 0
J. Mowlem & Co. ....	.....	10 6
L. & J. Pennington .....	.....	12 4
William Griffiths .....	.....	12 0
Nowell & Robson .....	.....	12 0
J. Russell	Cornish	9 6
Mickelthwait & Co. ....	.....	10 6
J. Somerfield	Belgian	9 7
C. M. Manuelle .....	.....	9 0
Van Fraegh & Co.	Leicestershire	13 3
En. Terry and Stoney Station Gra	.....

* Accepted.

† Including wharfage.

JARROW.—Accepted for the execution of several works at St. James's churchyard, gateway, drainage &c. for the Hedworth, Jarrold, and Jarrow Rural Board. Mr. J. H. Morton, architect, Jarrold-street, South Shields. Quantities by the architect—

J. Yeates, Jarrold-on-Tyne

KENDAL.—For excavating and laying 2,200 yards of 3-in. cast-iron water-pipes, culverts, &c., for the Union Rural Sanitary Authority. Mr. John Cannon, surveyor, Lowther-street, Kendal—

Robt. Tanner	£283 11 5
S. & W. Dirkin	278 15 0
Wm. Parsons	278 8 0
Wm. Parsons	278 15 0

LANGFORD HALL (Essex).—For the erection of farm buildings, for Mr. A. Lomas. Mr. P. M. Beaumont, M.Inst.C.E.—

Gezert	£1,075 10 0
J. Smith, Whitham	970 0 0
Richards	1,041 0 0

* Accepted.

LONDON.—For alterations and repairs at 64, City-road, for Messrs. Jarvis & Son. Mr. John Farrar, architect, Abney Chambers, 29, Salisbury Pavement, E.C.—

F. J. Wood	£330 10 0
S. Archer	185 10 0
Edie	145 0 0

LONDON.—For the supply and delivery of 10,000 sup. ft. of best 3-in. coiled hard York paving, for the Local Board. Mr. H. O. Thomas, surveyor, Town Hall, Woolwich—

	Per 100 sup. ft.
Nowell & Robson	£3 10 0
Walker	3 15 0
Mowlem	3 12 0
nonerford	3 14 0
Turner	3 12 0
Heavers	3 10 0
Manuelle	3 11 0
Fry Bros.	3 11 0
Trickett	3 11 0
Cowper & Co.	3 11 0
Griffiths	3 11 0

* Accepted.

LONDON.—For kerbing, paving, channelling, &c., Hawestead-road, Canford, for the Lewisham Board of Works—

Lagdon & Crawford, Canning Town	£601 0 0
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LONDON.—For making up and paving Ranelagh-gardens (Section I), and Town Meadow (Section II), for the Fulham Vestry. Mr. W. Sykes, New Streets Surveyor, Town Hall, Walling-garden, London, S.W.—

TOWN MEADOW-ROAD, SEC. II.				RANELAGH-GARDENS, SEC. II.			
Ready-made	York.	Admiral.	Victoria.	Ready-made	York.	Admiral.	Victoria.
Nowell & Robson	6 6	6 6	6 6	6 6	6 6	6 6	6 6
E. Farry	6 6	6 6	6 6	6 6	6 6	6 6	6 6
A. Kellet	6 6	6 6	6 6	6 6	6 6	6 6	6 6
E. Rogers & Co.	6 6	6 6	6 6	6 6	6 6	6 6	6 6
J. Meers	6 6	6 6	6 6	6 6	6 6	6 6	6 6
T. J. Brookes	6 6	6 6	6 6	6 6	6 6	6 6	6 6
H. J. Greenham	6 6	6 6	6 6	6 6	6 6	6 6	6 6
G. W. W. Hale	6 6	6 6	6 6	6 6	6 6	6 6	6 6
S. Hudson	6 6	6 6	6 6	6 6	6 6	6 6	6 6
S. Adams	6 6	6 6	6 6	6 6	6 6	6 6	6 6
J. Hampton & Co.	6 6	6 6	6 6	6 6	6 6	6 6	6 6
Imperial Stone Co.	6 6	6 6	6 6	6 6	6 6	6 6	6 6

LONDON.—For paving and roadmaking, Alney-road, Dulwich, for the Camberwell Vestry. Mr. O. S. Brown, surveyor, Works Department, Vestry Hall, Peckham-road, London, S.E. Quantities by the surveyor—

A. T. Catley	£1,600 0 0
Mayo & Co.	£1,381 11 8
Mowlem & Co.	1,553 15 0
W. H. Wheeler	1,528 10 0
him (accepted)	1,551 11 8
T. Adams	1,404 11 4
J. G. B. Marshall	1,400 13 4
French Asphalt Co.	1,004 18 4
Val de Travers	988 10 0
Co. (accepted)	986 10 0

LONDON.—For the execution of paving works and the supply of paving materials on a schedule of prices, for the Whitechapel District Board of Works. Mr. W. La Riviere, Surveyor to the Board—

	Paving.	Materials.
George James Anderson	71 per cent.	12 per cent.
John Mowlem & Co.	6 0	12 0
William Griffiths	31 0	81 0
William Farrar	91 0	91 0
William Gibbs	9 0	101 0
John Byford	15 0	15 0
Nowell & Robson	7 0	12 0
George G. Rury	10 0	12 0

LONDON.—For the erection of premises, Hetherington-road, Brixton, S.W., for Mr. J. Pratt. Mr. M. V. Trevelyan, architect and surveyor, Acree-lane, Brixton—

Rice & Son	£750 0 0
Young & Son	735 0 0

LONDON.—For alterations and additional stables to stables, Forest Lodge, Tulse Hill, S.W., for Mr. Geo. Adney Payne. Mr. Alfred Paton, surveyor, 93, York-road, Westminster Bridge-road, S.E.—

Maxwell & Co.	£539 0 0
Peacock Bros.	£458 10 0
Trotter & Sons	470 0 0

LONDON.—For the supply of about 2,000 ft. of special coiled York paving, for the Vestry of Brompton—

	Per 100 sup. ft.
A. & F. Manuelle, 101, Leadenhall-street, E.C.	£3 5 10

LONDON.—For kerbing, channelling, metalling, &c., Chestnut-road, Canford, for the Lewisham Board of Works—

Fry Bros., Greenwich	£339 0 0
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LONDON.—For pulling down and rebuilding, Nos. 64, 66, Gresham-street, City, for Mr. Frederick Stainton. Messrs. Gardiner, Son, & Trevelyan, architects—

Patman & Fotheringham	£1,307 0 0
Gould & Brand	10,857 0 0
Holloway Bros.	11,315 0 0
Grover & Sons	10,847 0 0
C. Ansell	11,100 0 0
Allen & Sons	10,665 0 0
Asby & Horner	10,987 0 0
Kilby & Gayford	10,534 0 0
William Downes	10,934 0 0

* Accepted.

LONDON.—For electric lighting and gasfiting at the "Green Man," Bucklersbury, City—

Christan	£104 0 0
Winn	£66 15 0
Fragnell	73 10 0

* Accepted.

LONDON.—For the erection of new drill-hall at Tredgare-road, Bow, for the T.N.H. Volunteers. Mr. G. E. Holman, architect—

Jarvis & Son	£2,863 0 0
T. H. Craig	£3,938 0 0
Yerry & Co.	4,450 0 0

* Accepted.

PALMER'S GREEN (Middlesex).—For finishing five houses at Bowers Park, Palmer's Green, for Mr. William Cox. Mr. J. W. Stevens, architect, 21, New Bridge-street, E.C.—

G. S. Archer, City-road	£785 0 0
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Accepted exclusive of necessary alterations.

PENRITH.—For the execution of water supply works, Glassonby, for the Penrith Union Rural Sanitary Authority. Mr. George Watson, C.E., Penrith—

Cast-Iron Pipes.			
Cochrane & Co.	£145	14	4
Clay Cross Co.	139	18	6
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R. Laidlaw & Son	£46 6 2
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J. McKnight & Son	£177 10 0
George Dixon	£80 5 10
Joseph Dixon	90 10 0

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Johnfield Co.	250 15 0	James & Co.	£39 16 6
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Dodds Bros. & Co.	45 11 6		

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George Dixon	71 7 0		

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J. McKnight & Son	£100 0 0	George Dixon	100 0 0
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Valves and Hydrants.

R. Laidlaw & Son	£46 6 2
J. Blakeborough & Co.	41 11 0
Stone & Co.	36 11 0
Hamilton, Woods, & Co.	27 10 0
Dodds Bros. & Co.	33 13 1

Excavating, Carting, Laying and Joining Mains.

J. McKnight & Son	£115 8 0
Joseph Dixon	£15 15 8
George Dixon	71 7 0

Service Reservoir, &c.

J. McKnight & Son	£121 6 4
George Dixon	£107 11 6

For the Whole.

Joseph Jackson, Penrith (accepted)	£280 11 1
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PORTSMOUTH.—For kerbing, channelling, road-making, &c., New-road, Buckland, for the Portsmouth Rural Board. Messrs. Baker & Cogwell, architects, 7, Prudential Buildings, Landport, Portsmouth—

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H. J. Cooke	1,253 11 0
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Petts & Son	£1,100 0 0
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SOUTH LONDON (Middlesex).—For the supply of road materials, for the South-London Local Board. Mr. I. Nowell, Surveyor—

Sifted gravel.	Broken	Hoggan
at per	at per	at per
cube yd.	cube yd.	cube yd.
Henry Lee	3 10 4	3 10 4
Henry Lee	3 10 4	3 10 4

SOUTH SHIELDS.—Accepted for the erection of infirmary pavilion, infirmary wards, laundry buildings, &c., at the workhouse, for the Union Guardians. Mr. J. H. Morton, architect, King-street, South Shields. Quantities by the architect—

Cowper & Henderson, Jarrold-on-Tyne	£9,137 6 2
---	------------

SOUTH SHIELDS.—Accepted for laying about 730 yards earthenware pipe-arch at Whitburn Colliery Village; and other work, for the Union Rural Sanitary Authority of the South Shields Union. Mr. J. H. Morton, architect, King-street, South Shields. Quantities by the architect—

Wm. Allison, Whitburn	£214 0 0
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SOUTH SHIELDS.—Accepted for the construction of a reservoir at the workhouse, for the Union Guardians. Mr. J. H. Morton, architect, King-street, South Shields. Quantities by the architect—

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Balnbridge & Crismon, South Shields	£170 0 0
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 J. Davison £1,522 11 11 J. P. & Co. £13,500 9 9
 J. G. Robson 14,525 0 0 Johnson & Hanby 13,578 0 0
 Craggs & Benson 14,331 0 0 W. C. Atkinson,
 Haslam Bros. 14,525 2 3 Stockton - do -
 A. J. Cooke 13,750 0 0 Tens 13,334 4 7
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 11
 straight circular.
 Thomas Adams, Green Lanes, N. £10 5 2 £10 6 0

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 ambulance room over, Church-street yard, for the Local Board.
 Mr. Edwin Smith, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

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THE RED CASTLE MANSIONS, ZÜRICH—MESSRS ERNST & CO., ARCHITECTS

The Builder.

VOL. LXV. No. 2653.

DECEMBER 9, 1905.

ILLUSTRATIONS.

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"Blawith," Grange-over-Sands.—Messrs. Willink & Thicknesse, Architects.....	Double-Page Photo-Litho.
Design for Chapel, Gray's Inn Gardens, W.C.—Mr. Walter J. Tapper, Architect.....	Single-Page Ink-Photo.
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Orientation as an Element of Architecture.

HERE seems to be hardly any room now for reasonable doubt that we must regard the orientation of ancient temples as an important element, in many cases at all events, in determining their position on their site, and even to some extent their architectural arrangement. We take the word orientation here in its wide and general sense, as applying not merely to the actual pointing of the axis or the principal entrance of the building towards the east, but to the whole principle of placing or planning a building with reference to the position of some one of the heavenly bodies. As was mentioned in the course of the recent discussion on Mr. Falkener's paper at the Institute of Architects, the system of solar orientation has a most important bearing on the practical question of the lighting of Greek temples, since if we admit that the important moment of worship was the sunrise at a special annual festival, and that the principal opening of the temple was turned towards the rising sun on that day, we have at once, in the case of a clear southern atmosphere and strong southern sun, a sufficient provision for the lighting, which has been such a point of contest for a long time. And even apart from the precise and calculated orientation for the specially sacred day, the entrance would for all times of the year be sufficiently turned towards the sunrising quarter to admit the direct morning sunlight far into the building.

This, however, is the most superficial though the most practical aspect of the subject. Something much more interesting than a mere question of lighting is involved in what is now at least the strong probability that the temples of the Egyptians and of the Greeks were to a great extent placed with regard to the rising or setting of special stars. In regard to the Egyptian temples, Mr. Norman Lockyer brought forward some little time since, in a series of papers in *Nature*, the evidence which he had collected as to

coincidence of the axes of various Egyptian temples with the calculated positions, at the period when the temples were built, of certain stars; and it was even suggested that the dates of some of their temples might be fixed, where uncertain, by working out the period at which their axis would have coincided precisely with the position of a star to which they were apparently intended to orientate, but which the precession of the equinoxes had in process of centuries carried away from its place at the time the temple was built. There is obviously some little room here for the temptation to argue in a circle; and obviously also, when the idea has once been suggested and a probable confirmation of it has been found in several cases, there is the temptation to see orientation everywhere, the more since, as before observed, when it comes to orientation in regard to stars, there are always plenty of stars to choose from.

In regard to Egypt, however, everything that we know or can gather about the ancient Egyptians leads one to the conclusion that with their obvious leaning towards mysticism and symbolism in their art, the geometric character of their architecture, and its tendency to expansion into long avenues and vistas leading from light to gloom, they were just the very people to have carried out a system of solar and stellar orientation, to have connected the setting out of their architecture with the movements of the stars; and the actual evidence on this point in regard to Egyptian architecture has the support of what we may call the inherent probability of the theory. This inherent probability, though the phrase may seem a loose one, is really an important element in forming a conclusion on such a subject. The style of the architecture has or should have a great deal of influence on our estimate of the weight of the other evidence. Where we find an architecture sternly geometric in plan and proportion, we may the more readily conclude that the authors of such an architecture would have been capable of setting it out correctly in reference to the positions of sun or stars, and that their habit of mind would be likely to lead them to such computations. So far as the science of the day could take him, we may conclude from

the evidence of his works that the Egyptian architect was a man of scientific turn of mind. When we find an architecture irregularly and carelessly planned and set out, informal and unsymmetrical in its lines, we should require in that case much stronger evidence to make us accept the theory that its structures were intended to be laid out in reference to observed or calculated movements of the heavenly bodies. The architect who is geometrician enough to do this is geometrician enough to set out his buildings rectangularly and symmetrically; the habit of mind which leads to correct observation of celestial movements is likely to lead also to the correct appreciation of terrestrial measurements and proportions: a remark the application of which will be apparent further on.

The subject of orientation in connexion with the Greek temples has been taken up by Mr. Penrose, whose exceptional acquaintance with Greek architecture, together with his mathematical attainments, naturally gave him special qualifications for the elucidation of the subject. The results of his study of the subject so far are before us in the shape of a paper embodied in the *Philosophical Transactions* of the Royal Society,* under the title "Results of an Examination of the Orientations of a number of Greek Temples," undertaken "with a view to connect these angles with the amplitudes of certain stars at the time the temples were founded, and an endeavour to derive therefrom the dates of their foundation by consideration of the changes produced upon the right ascension and declination of the stars by the precession of the equinoxes." The "amplitude" of a star is its angular distance from true east or west at rising or setting. Mr. Penrose says "the point being considered as proved that the axis of a temple was pointed to the rising or setting of some particular star, the next step is to discover which star was chosen." There is no question that in regard to Egyptian architecture the point is proved by the translation (quoted from Mr. Lockyer's investigations) of two passages in a hieroglyphic inscription in regard to the rebuilding of a temple by Seti I. about

*Kegan Paul, Trench, Trübner & Co., London; 1893.

1445 B.C., which we may re-quote here, for those of our readers who have not seen them. "The living God, the magnificent son of Asti (a name of Thoth), nourished by the sublime goddess in the temple of the sovereign of the country, stretches the rope with joy. With his glance at *Ak* (the middle?) of the Bull's Thigh constellation, he establishes the temple-house of the mistress of Denderah, as took place before." The other quotation is apparently from the same inscription and referring to the same operation; "looking to the sky at the course of the rising stars (and) recognising the *Ak* of the Bull's Thigh constellation, I establish the corners of the temple of her majesty."

This is as complete evidence as we could wish to have in so brief a sentence. We have the line set out with reference to the star by stretching a rope, and the angles of the temple set out again from that; and it is perfectly logical to conclude that this is a description of a commonly accepted process, and not an isolated instance. The only question which arises is, whether this statement would be equally true in regard to the setting out of a Greek temple one thousand years or so later. There is a strong probability that it was, more especially in the case of archaic Greek temples which were nearer to the date of this Egyptian inscription, considering the close relation between Egyptian and Greek architecture; and although the Greeks of the great period were a much less less mystically-minded people, probably, than the Egyptians, they had the same love of geometric precision, and it seems inherently probable than an idea which had been so much impressed on their architecture at its origin would continue to exercise its influence. But accepting this probability, one or two of the facts given by Mr. Penrose seem a convincing confirmation of the theory. The two Temples of Athéné, on the Acropolis at Athens, can both be referred to the Pleiades, a constellation sacred to the goddess; and Mr. Penrose gives the block plans of the archaic temple, and of the Hecatompodon, which occupied what was afterwards the site of the Parthenon. These are on slightly converging lines, the one in the more ancient temple coinciding with the line which would be required for observation of the Pleiades about B.C. 1500, the southern temple (the Hecatompodon) having a more northerly orientation, so as to follow the later northerly declination of the same group of stars. Similarly two temples at Rhamnus, belonging to the same cult, but of different dates, show slightly converging lines in their axes, apparently calculated to follow the change in position of the star Spica. The mere fact of these slight alterations in axis in two cases of temples of the same cult and of different dates, seems to give a high degree of probability that such a change had a purpose, and when it is found that these changes in direction coincide with the change in the position of a conspicuous star during the period which probably elapsed between the building of the two temples, it seems hardly possible to doubt this cumulative evidence in favour of the theory. Mr. Penrose gives another plan, that of the temple on the mountain at *Ægina*, which is orientated towards the rising sun, but in which the west door is placed somewhat out of centre of the portico. Mr. Penrose suggests that this was with the object of observing the setting of a star (*Antares*) which was rather south of the central axis of the building, and that in this position of the doorway the setting of the star could be observed from the interior of the Temple. There must certainly have been some very strong reason to induce any Greek architect, with his usual love of symmetry in the detail of each building, to carry out an arrangement in itself so unsightly as the placing of a main door, under an end portico, out of centre with the portico; and we should regard this as one of the most significant facts mentioned in the

paper. Mr. Penrose also draws attention to the occasional cases of temples built with their longer axis north and south, in which cases he suggests that they would have eastern doorways at the side, for the observation and the admission of the rays of the rising sun; as was actually the case at Bassæ.

We cannot follow out in more detail the evidence contained in this paper, which, short as it is, includes a great amount of information, and which should be procured and studied by all who are interested in Greek architecture and in the curious and singularly fascinating subject of what may be called the astronomical relations of ancient architecture. We may diverge from the main subject here to notice the short article by Mr. Theodore Bent, in the current number of the *Nineteenth Century*, on the origin of the Mashonaland ruins, in regard to which Mr. Bent repeats, and brings some new evidence in favour of, the theory that these irregularly-planned and barbaric buildings were planned with special regard to orientation. We cannot think that there is anything like the same inherent probability in favour of such a theory in the case of such structures as these, which show, of course, nothing of the careful geometric setting-out of lines which characterise the structures of Egypt and Greece. The only fact which seems to argue anything like a geometric setting-out of these temples is the relation between the circumference and the height of certain of the circular structures connected with them; otherwise we should hardly expect to find precise and scientific orientation in the case of structures with such irregular enclosing walls. The ornamentation on the walls on the eastern side is no doubt significant, but we are inclined to think that a little too much has been discovered in ruins of Zimbabwe. The most interesting fact mentioned in Mr. Bent's article is in regard to those remarkable hawk figures which form certainly the most curious and interesting details in the Mashonaland remains. Mr. Bent quotes Mr. Boscawen's statement, in connexion with these sculptures, that in the ancient quarries of Egypt he had everywhere found sculptures of the hawk as apparently "a guardian emblem." Taking with this the fact of the obvious traces of goldmining operations in connexion with the Mashonaland ruins, Mr. Bent draws the inference that these structures were the work of a more Eastern people who had penetrated into Africa, mainly with the object of mining, and brought with them the Oriental symbol of the falcon, in connexion with such work. This is at all events a very interesting suggestion.

Returning to the Greek temples, we may observe in conclusion that the theory of orientation for which Mr. Penrose has offered such probable and almost conclusive evidence has one very important bearing on æsthetic criticism. We can now see why it was that the Greeks, who were such lovers of symmetry and parallelism in the design of each temple, should nevertheless have shown such apparently wanton disregard of symmetry and parallelism in the placing of these structures in relation to one another; why the temples on the Acropolis are placed at such varying and apparently accidental angles, and the little temple of *Niké Apteros* appears so oddly and capriciously just out of square with the lines of the Propylæa. The argument which has been brought forward occasionally, in regard to modern questions of the alignment of buildings, that the Greeks regarded it as an object to avoid parallelism in placing their buildings, has no longer any weight. It was not that the Greeks were indifferent as to the lines on which their temples were set out. It was that they were seeking a parallelism with the celestial, not with terrestrial objects. The additional poetic as well as scientific interest which is thus given to the study of ancient architecture it is hardly necessary to point out. The temples of the Egyptians and Greeks become, from this point of view,

something more than merely terrestrial architecture; they became parts of a symbolism which links the perishable work of man with the whole cosmic machinery of which, to the ancient mind, this globe was the centre.

STONE STATISTICS—A CRITICISM.

THE annual Blue-book relating to the mineral statistics of Great Britain and Ireland is in some respects a most unsatisfactory compilation. The current volume, for 1892, issued not long since, professes to give "an account of the quantity and value of all minerals wrought in mines, the value of all minerals obtained from open-works, brine-works, &c." It also states that "an annual return is required to be sent from every mine to the inspector for the district (in which the mine is situated) specifying . . . the quantity of minerals dressed and of the undressed mineral sold, treated, or used during the year." Desirous of obtaining information concerning the magnitude of the stone industry we therefore consulted this Blue-book, and turned to the section headed "Stone, &c." Judge our surprise on reading the first two sentences—"The quantity of stone obtained from mines is small in proportion to that obtained from open works. The actual quantity obtained is *not known*," but an estimate of its value has been made by assuming that each person employed produces annually stone or other mineral of a definite average value." Then follows a table based on the census returns for 1881. Now, we will say nothing as to the inaccurate statement that the report contains an account of all minerals wrought in mines and open works, as we are, unfortunately, only too familiar with the fact that in such returns grandiloquent introductory observations are frequently modified as the subject develops. We may also overlook the somewhat apologetic explanation that the quantity of stone raised in open quarries is unknown. But when we find that a deliberate attempt is made to estimate the quantity of stone thus obtained from census returns; and that the stone statistics relating to 1892, are based on the census of 1881, we ask ourselves whether any possible value can be attached to such nonsense. We will assume for a moment, however, that each person employed does produce annually stone of a definite average value; the question then arises as to the capability of the census returns to accurately state the number of quarrymen in the kingdom. What is a quarryman? Is he to be defined as a man who merely dislodges stone from the parent rock, or as one who works in a quarry in any capacity? From our knowledge of various quarrying districts, we find that even the men employed answer such questions in a very uncertain manner. A man who in one district is styled a quarryman, might be termed in another a stone labourer, even though they both do the same class of work. In many parts of the country large numbers of men are alternately employed as stone getters, as breakers, as rough masons, as farm labourers, carters, &c., according to the time of year and state of trade.

If everyone who works in a quarry is to be termed a quarryman, then we fail to see in what way an all-round estimate can be formed as to the average annual output per man over the country. For in some open workings quite half the men are employed in riding overburden, whilst in others not more than one in twenty is so engaged. Many open quarries, by reason of inclemency of the weather, or otherwise, have to be closed entirely during the winter months. Is the work done per man in these, allowed to be as much per annum as in cases where operations are conducted all the year round?

The official lists of stone mines are by no means as complete as they ought to be. We

find no mention, for instance, of those near Tisbury, in Wiltshire; and whilst a complete enumeration is made of the stone mines of the Bath district, those in the Isle of Purbeck are dismissed in one line as "Swanage and neighbourhood." The several categories under which the produce of the stone mines are described do not appear to follow any definite scheme, but vary, apparently, with the caprice of the inspector making the return. At least, there does not appear to be any serious attempt at classification in the form in which the returns are ultimately printed. One searches in vain for the relative quantities of granite, sandstone, limestone, &c., produced. Indeed, we do not find the word "granite" mentioned, although it is tolerably certain that at least one-third of the total number of men employed as quarrymen are engaged in getting that class of stone. We observe that road-metal is placed in the same category as building sandstone. The term "freestone" in the volume covers a multitude of inconsistencies; and the reason why limestone from Walsall and Dudley should be distinguished by its geological horizon, "Silurian" being prefixed, whilst others, irrespective of their position in the geological scale have to be content with being called "limestones" simply, is perhaps only known to the compilers of the statistics. In many instances the produce of the mines is merely referred to as "building stone."

The whole of the statistics relating to the subject are hopelessly mixed up with those which refer to sand, chalk, shale, clay, chert, calc-spar, flint, gravel, &c., so that it is impossible to get any idea of the actual amount of building stone raised per annum, or of its value. Neither are the figures stated in such a manner that these particulars could be arrived at by any process of selection or elimination.

How differently they do these things in the United States. There, in the annual account of the mineral resources of the country, the various kinds of stone are divided into sub-heads and treated separately. Turning to the volume for 1891, which was issued only a month or two since, we observe that the subject is referred to under (1) granite, (2) sandstone, (3) limestone, (4) marble, (5) slate and (6) bluestone. In the British returns the only one of these divisions treated separately is slate, though no bluestone (as the term is used in America) is found here. Instead of regarding the section "stone" as a kind of refuge for stray earthy minerals, the compilers of the United States Report have rigidly excluded everything therefrom that does not appertain to the subject. Thus we find separate sections for natural and artificial cements, buhrstones, grindstones, oilstones, whetstones, &c.—truly a model for our own Government officials to work from.

It is difficult to understand the reason for so little attention being paid by the authorities to statistics of stone raised in the United Kingdom. According to the compilers' own showing, the minerals included under this head were valued in 1892 at 8,667,736*l.*, so that so far as value is concerned, stone is the most important mineral raised in the whole kingdom with one exception, viz., coal, which in the same year was valued at 66,050,451*l.* Few people would imagine that the annual value of stone raised is much greater than that of iron ore, which in 1892 amounted to 2,970,632*l.* The value of slates and slabs was more than one-third that of iron-ore—viz., 1,025,922*l.* Taking the whole mineral produce of the country we find that the most important in point of value is coal, next stone, then iron ore, and the fourth slate. If we exclude coal, the value of stone raised in 1892 was more than half that of all the other minerals put together; that is, including other cognate materials placed under the term "stone, &c.," by the compilers. We are inclined to think, from statistics gathered in quarries for some years, that the Blue-book has altogether underestimated the number of men employed

in quarries or as quarrymen, and that the amount of stone annually turned out is larger than is even here suspected.

We do not ask that every little wayside quarry should be visited by the inspector, no good could possibly come of that; neither do we expect that every Local Board which spasmodically draws a little road stone from a hole in the ground, or the farmer and the local carpenter and builder who employ an occasional labourer to get out small quantities from a stone pit, shall be troubled to furnish an accurate account of their doings. But it is not too much to suggest that some statistics of important stone centres, like Portland, for instance, might be included in the annual return. There is not a single stone mine in that island, all the quarries being open, so that they do not come within the operations of the "Coal Mines Regulation Act," or the "Metalliferous Mines Regulation Act," and no statistics of the same are published therefore in the "Mineral Statistics," except in the item based on the number of men employed, to which we have previously adverted. And yet it is not difficult to obtain such statistics from Portland. Apart from the figures which might be derived from the royalties, &c., paid, a tolerably accurate estimate could be formed of the quantity sent away from the only railway station, as well as that sent by road and shipped from the piers. Taking another district, Bath, it certainly seems rather anomalous that whilst the stone obtained from underground quarries is carefully recorded, that from open quarries hard by is practically neglected. We refrain from quoting similar instances. We cannot help wondering, however, what has been done with those quarries which, like Seacombe—one of the Purbeck-Portland group—are worked partly in the open and partly underground. Are they also included under the general heading "Chalk, flint, limestone, sandstone-slate, sandstone-flags, slate and stone of other kinds from openworks"?

The fact is that in their present form the statistics relating to stone, as published in the annual Blue-book, are of very little use to anyone. They are compiled more from theoretical data than from actual facts, whilst the latter are not set out in an intelligible manner. They include a heterogeneous assemblage of minerals, the respective statistics of which cannot possibly be differentiated the one from the other, and which for the most part have no bearing whatever on stone, or the stone industry. No attempt is made to show the relative importance of the various kinds of stone; whilst the list of stone mines given is very meagre. Until something of a more substantial and accurate nature is capable of being drawn up by those responsible for the compilation, it would be well to withhold the publication in future of that section of the "Mineral Statistics," entitled "Stone, &c."

NOTES.

THE debate in the House of Lords on the second reading of the Employers' Liability Bill was interesting chiefly for the light which it threw on the intentions of the Upper House in regard to the subject of contracting out. Any doubt is now set at rest by the amendment proposed by Lord Dudley, by which not only are members of existing industrial societies to be allowed to contract themselves out of the Act, but also such as may be, under various safeguards, formed in the future. We have more than once pointed out that the amendment moved by Mr. McLaren in the House of Commons was deficient in that it did not provide for the future as well as the present. If the Bill becomes law as amended by Lord Dudley, it will be a useful and reasonable measure, not limiting individual freedom too much, but allowing friendly arrangements to be made between employer and employed, and at the same time enlarging the existing law in a direction favourable to the artisan.

A CONFERENCE was held at the end of last week on "The Christian Organisation of Labour." It has been hitherto supposed that the clergy and religious teachers had to look after the morals of the community. It now appears that, having failed to bring the nation to a high moral standard, a body of the clergy and their supporters have decided to try their hands at getting a high wage for persons who are unable by their own merits to obtain it. Canon Scott Holland moved the first resolution, viz., "That the Christian Organisation of Industry involves the maintenance of a living wage, by which this Conference understands such a wage as shall enable the workers to maintain healthy and human homes." A good many of the homes of the labouring classes are already very human indeed, if by human we mean what is common to the ordinary human being. But as a matter of fact these light-headed gentlemen who assembled in conference did not understand in the least what they meant. A number of sensible persons would never have used such a ridiculous phrase as "human homes." We only dwell on this alliterative duplication of words because it shows the kind of nonsense which men of some slight note can talk. What we object to, however, is the way in which these impulsive parsons rush in to better the condition of the artisan, when scores of their own cloth are comparatively worse off than many manual labourers. Of course, the conference talked a quantity of nonsense about the "living wage," which, they said, was such as would enable a man to maintain a decent, moral, and healthy home. The power to maintain a decent home depends largely on the individual capacity of the head of it, not on the amount of money which he receives. The only good done by such a conference is to show how utterly senseless is this talk of a "living wage."

SOME recommendations of the Commission appointed by the Government of Baden for the preservation or restoration of Heidelberg Castle have recently been published, owing to the numerous reproaches as to intended acts of vandalism made against the authorities. It is distinctly stated that an entire, or even partial restoration is completely out of the question, and that the works to be undertaken must be in every case directed towards preserving what already exists, except where, in any special instance, restoring is rendered imperative by an advanced state of decay. Keeping this in view, a complete new system of drainage will be inaugurated, which it is hoped will prevent any further subsidence of the walls. The Commission recommended that plaster casts be taken of the decorative figures on those parts of the castle which have been condemned, so that reliable copies shall be forthcoming; but the old figures, patched up, are for the present to occupy their positions, whilst copies in stone, ready to take their place on their complete disintegration, will be kept under cover. In order to bring the courtyard into greater accord with its surroundings, it will be laid out as a garden, and the old fountain will be set up again in the centre; whilst, finally, all vegetation will be removed from those places where it either hides important parts of the building or endangers the existence of any portion of it. It is estimated that the total cost involved is about 12,500*l.*

WE learn from our contemporary, the *Centralblatt der Bauverwaltung*, that a book on the late Theophilus Hansen has been recently published at Vienna by his disciples, Messrs. Niemann and v. Feldegg. According to this biography Hansen was born at Copenhagen in modest circumstances, but at the instance of an elder brother, at an early age, emigrated to Athens, where he laid the foundations of his future greatness. The Observatory there

was planned by him. His greatest achievements are at Vienna: the Exchange, the Academy, and the Houses of Parliament having been built from his designs. The last years of his life he devoted to ideal work, holding aloof from all competitions; and at the end he was occupied with designs for the beautifying of his native town and of his beloved Athens. His industry was amazing; even in his seventy-fifth year he was in the habit of working eight hours a day.

WE print in our Correspondence column a letter from Mr. C. J. Ferguson with regard to Tullie House, Carlisle, which will probably pretty well convince all our readers that the letter from Mr. Simpson on the same subject, which we printed a fortnight since, was not written without good cause. From documents and newspapers before us it is perfectly obvious that the whole inception of the scheme of converting Tullie House into a School of Art and Free Library was due to Mr. Ferguson, that he practically designed the whole thing, and even furnished full-sized details for the front; that he gave all this work to the Corporation as a labour of love, and that they put it into the hands of their Surveyor to carry out because (as publicly stated at a meeting in December, 1890) the Corporation believed that they could effect a saving of 20 or 30 per cent. by having the work carried out by their own officials. Mr. Ferguson's plans, published in the *Builder* of May 9, 1891, are in all essentials identical with the illustrations of the finished work published in the *Carlisle Journal* of November 10; the new street front is identical with a drawing for it by Mr. Ferguson now in our possession, and we have actually a letter of the Corporation Surveyor to Mr. Ferguson, dated January 16, 1891, acknowledging the receipt of the plans for proposed buildings for Public Library, Art Gallery, &c., and promising to consult him and receive his advice in case of any deviation therefrom; and another letter from the Surveyor, of April 10 of this year, asking Mr. Ferguson for further details of the Castle-street front. And after all this, the Corporation Surveyor, who had been entrusted with the carrying out of the work as a matter of supposed economy, is ready to take the whole credit of it, and to receive (and quote) the congratulations of the Mayor on the noble building which he has erected! This kind of attitude on the part of a corporation surveyor, of making use of the ideas of an independent architect and claiming credit for them himself, is unfortunately not a novel incident, but we do not remember any instance in which it has been carried out in so barefaced and unblushing a manner as this.

AN application by Mr. J. T. Chappell for a patent for fire-proof floors has been opposed by the owners of Mark Fawcett & Co.'s patent floors, and the opposition has been admitted and the patent refused by the Comptroller-General on the ground that the floor is substantially the same as Mark Fawcett & Co.'s. The only difference worth mention is that the tubes are bulged outward in section from the bottom to the top, so that the spaces for concrete between them become of a dovetail shape, and the concrete and tubes are more completely united structurally. This is an improvement, as the tubes benefit by the supporting element in the concrete, but it is not such an improvement as to give a new patentee a right to practically rob the defendants of their patent. There has been far too much of this system of getting hold of a good existing patent, and claiming it over again for some small improvement in detail, while copying all its essential points. This kind of thing ought to be stopped, and we quite concur with the Comptroller's judgment in the case referred to.

IN a pamphlet under the title "Oxy-oil Gas and its Use for purposes of Enrichment (Tatham's process)," Dr. Thorne gives the results of his own and Dr. Salomonson's observations and experiments with the system of enriching coal gas by the addition of small quantities of oxy-oil gas. Oxy-oil gas itself is obtained by the volatilization and decomposition of shale and similar oils at a comparatively low temperature in suitable retorts, and the addition to the hot gas of about 15 per cent. of oxygen. According to Dr. Salomonson, it is important that the oxygen should be added to the hot gas, a much less satisfactory result being obtained if the admixture is made when the oil gas is cold. Very remarkable results have been obtained, which seem to prove the surprising greatness of the gaseous mixture, and its great enriching power when added to a poor coal gas. The addition of about 6 per cent. of oxy-oil gas to a 16½ candle gas brought up the illuminating power to 22 candles, and this at a cost per candle of less than one-third of a penny, a figure far below the cost of enriching by any other process. The economical importance of a cheap and effective method of enrichment will be better grasped when it is remembered that, according to Mr. Dibdin, the Superintending Gas Examiner to the London County Council, in London alone the annual value of a candle in the illuminating power of 16-candle gas is, in round numbers, 200,000l. Some authorities estimate the usual cost, under favourable circumstances, at about 2d. per candle for each thousand cubic feet of gas. The oxy-oil gas process is undoubtedly a promising one, and if no unforeseen difficulties arise it should prove of the greatest value in enabling a brilliant illuminating gas to be supplied at a cheap rate, even when coal ordinarily incapable of yielding satisfactory results is employed.

UNDER the title of "Vanishing London," Mr. R. W. Paul is about to publish, by subscription, a volume of drawings of some of the most interesting of the houses in London and Westminster which are threatened with demolition, or probably will be so before long, in the course of London improvements. The book will also include drawings of some buildings which have already disappeared. Mr. Paul's drawings are sure to be of good quality, and the book ought to be of interest as a record of some of the picturesque bits of Old London which are every year disappearing.

WE hardly find the present Exhibition of the Society of Painters in Water-Colours (opened last Monday) equal to the average. The best men are not at their best, and there is a good deal of work which is not very interesting; some which is quite unworthy of the Society's reputation. Among the best works are Mr. Albert Goodwin's grand little view of "Whitby Abbey" (13), in which the sky is perhaps a little overdone; Mr. Hemy's two capital studies of sea, "Wind Westerly" and "Wind Easterly" (27 and 43); Mr. Tom Lloyd's "Thunder Clouds" (31); Mr. Eyre Walker's "Autumn Sunshine" (39), a grand bit of landscape; Mr. Cuthbert Rigby's "Tilberthwaite Valley" (74), remarkable for the fine treatment of the sunset middle distance; Mr. Hemy's "Old Warship" (148), a fine study of the grand old sailing line-of-battle-ship which is one of the beautiful things that have vanished from among us; Mr. Alfred Hunt's "Windsor Castle" (196); Mr. Hunt's other drawings are rather slight and repeat old subjects of his; Mr. Lionel Smythe's "Rick Building—Pas de Calais" (103), which however errs in the direction of too much "breadth," and is obviously painted under modern French influence; Mr. A. Goodwin's bright view of "Siena" (209); Mr. C. B. Phillip's powerful hill scene, "Rocky Butresses" (259); Mr. Walter Duncan's "A Merry Song" (287); and Mr. E. R. Hughes's "Shepherd Boy" (359).

an exquisitely finished little painting in an old-fashioned miniature-painting style. Architectural subjects are tolerably numerous; among them "At Tivoli," (15), by Mr. A. D. Fripp; "Charing Cross Bridge" (20), by Miss Rose Barton; "Piccadilly" (35), by Mr. Herbert Marshall; "Richmond Bridge" (119), by Mr. R. W. Allan; "A Street in Syracuse" (124), by the same artist; two views in Ventimiglia (144, 160), by Mr. Chas. Gregory, and a beautiful and highly-elaborated view of the town of "Chinon" (166), by the same artist, who manages to combine topographical accuracy with artistic effect; "The Embankment—Winter Study" (175), by Mr. Herbert Marshall; "Edinburgh" (201), by the same; "Primrose Day" (225) a study of part of Westminster Abbey and St. Margaret's by Miss Rose Barton, who seems to take Mr. Herbert Marshall as her model; one or two bits of old French towns by Mr. T. M. Rooke; "The Strand," showing St. Mary's in the foreground (340), by Mr. Herbert Marshall; two curious small views of "Salisbury" and "Wells" (325, 346), by Mr. Walter Crane, in the latter of which the central tower is not upright; and a set of "Pencil Sketches of Verona" (367), by Mr. S. T. Hodson.

MR. WALLACE RIMINGTON'S set of water-colour drawings in Spain, now on view at the Fine Art Society's Gallery, are more interesting architecturally and topographically than in a purely artistic sense; but they sum up a good deal of interesting illustration of Spanish architecture, some of it in out-of-the-way and little-known places. Among interesting details shown in the drawings are the picturesque (and most unsanitary) enormous projecting carved eaves in Fontarabia (29), which overshadow the whole street; the gate of Fontarabia (11), the Moorish gate of Segovia (56), and the walls of Segovia (60) with their curious semicircular buttresses. The excuse for the enormous poppies in the garden of an Alcazar (14), that "they were very near, hence their apparent size," will hardly do: the artist has endeavoured to include too much in the view, and the flowers in question do not take their proper place in the perspective.

MR. RICHMOND'S lecture on Mosaic at the Arts and Crafts Exhibition on Thursday last week formed an excellent conclusion to a very interesting series of lectures. The lecture was a very practical one, and instead of mosaic pictures the audience had presented to them as illustrations only a series of various arrangements of bands of colour in parallel strips, to illustrate the effect of one colour upon another in juxtaposition, which is such an important consideration in every work of colour decoration on a large scale, especially as to the manner in which the outlining colour affects the colour of the enclosed superficies. The whole lecture was evidently suggested by the artist's experiences in the work on which he is now engaged at St. Paul's. He stated that for decorating a dome he preferred concentric treatment in sectional bands; in which work quite concur. Mr. Richmond said that he had found the faults in the earlier portion of his work, before he had quite found his way in it, chiefly arose from too weak outline, and too small tesserae. In regard to some of the special experiences on the effect of colour on one another he had found, among other things, that white tends to spread very much, and that blue in mosaic work and at distance from the eye, tends to look blacker than a red outline round blue has the effect of turning it to purple; a black outline enhances the blue. White division lines on gold had a feeble effect; red was better. He preferred a crackled gold ground to a flashing gold; the latter tended to reflect darks. He had found much assistance in his designs (as we should expect) in the study of Mediaeval illuminations and

early oil-paintings, and also had found Persian carpets very suggestive for decorative work. Mr. Richmond was strong in his preference for conventional design for mosaic, and the entire avoidance of what is ordinarily called pictorial effect; in which everyone who knows anything of the matter will agree with him. We do not feel so sure in regard to his opinion in favour of minuteness and multiplicity of detail in mosaic. On the other hand, the remark that mosaic was peculiarly fitted for architectural decoration because it was itself in a sense architectural work—a kind of building up of a picture in separate pieces, as a building is built of separate stones—ought to have delighted the heart of every architect present.

THE LONDON COUNTY COUNCIL AND THE SESSION, 1894.

THE COUNCIL have published statutory notices of their intention to apply to Parliament in the ensuing Session for leave to bring in seven Bills for various purposes, whereof we give a summary.

A Bill relating to streets and buildings in London, its general object being—

To consolidate in a simpler form, but with various additions, extensions, amendments, and alterations, the existing statutes (partly public and partly local) which are now in force regulating the management of streets and roads, the formation and laying out of streets and roads, and the construction, alteration, and control of buildings.

The Bill, which is of a very comprehensive character, provides also for the appointment, control, and dismissal of District Surveyors, their qualifications, fees, and salaries, returns made by them, and generally for their powers and duties; for the appointment of a Superintending Architect of Metropolitan buildings, the conduct of his department, and appeals against his decisions; the prevention of insanitary dwellings; the prohibition or regulation of dwellings on land liable to floods or other low-lying land; the prevention and control of "sky-signs" and other erections or things over, upon, or connected with buildings; and the lighting of staircases and passages in flats or tenements where used in common and open at night; also for the establishment of a paid tribunal of appeal, and the imposition and recovery of penalties, forfeitures, and costs.

Improvements.—To alter and reconstruct Highgate Avenue, with a widening and improvement of Archway-road beneath; contributions towards the cost to be made by the Ecclesiastical Commissioners, Middlesex County Council, Islington Vestry, and Hornsey Local Board. To widen Wood-lane (leading, northwards, from Shepherd's Bush to Wormwood Scrubs) for about three chains in length from its south (Uxbridge) end; the Hammersmith Vestry to contribute. Purchase of four houses in Warner-street and Mount Pleasant for an enlargement of their Weights and Measures Office, Rosebery Avenue; and of new sites for purposes of the Metropolitan Fire Brigade Acts; in Edgware-road, by Lyon's-mews; at their present station in Simpson-street, Battersea; and a plot of land (belonging to the Corporation) next north of St. John College and the new offices of the Thames Conservancy, Victoria Embankment. New coroner's courts and mortuaries in Virginia-road, Bethnal Green; Goldhawk-road, Shepherd's Bush; the Manor House laundry, Manor-place, Paddington; Cuthbert-street, Paddington; Church-court, Nos. 9, 10, at back of Kensington Town Hall. Extension of time to complete the Blackwall Tunnel, the purchase of the Isle of Dogs bridges, the new street from Evelyn-street to Creek-road, Deptford, and widening of St. George's-place, Knightsbridge. To acquire, compulsorily or by agreement, Lincoln's-inn-fields garden as an open space, and repeal 8 Geo. II., cap. 26: "An Act to enable the present and future proprietors and inhabitants of the houses in Lincoln's-inn-fields to make a rate on themselves for raising money sufficient to enclose, clean, and adorn the said fields."

Tower Bridge, Southern Approach.—A new street from the junction of Old Kent and Bermondsey New roads to Tooley-street, opposite the bridge. This thoroughfare will be made by widening Bermondsey New-road to Star-corner, thence to Artillery-street, at a point opposite the end of Church-row and then by widening Church-row into Tooley-street. The new street appropriates the ground and houses of

Bermondsey-square (which is the site of the court-yard, or main quadrangle, of the old Cluniac monastery), and of Providence-place; it also takes in a part of the ground around St. Mary Magdalen church.

Markets.—To establish and maintain markets, and to confer on the Council the sole right to establish additional markets in London: with powers to acquire any existing markets and market rights, and require owners to sell to them, on agreement or by arbitration, the following: Borough Market, Southwark; Covent Garden Market; Spitalfields Market; the Shadwell Market of the London Riverside Fish Market Company; and the Great Eastern Railway Company's Market, Stratford. This Bill extends to the closing, or improving (with their approaches) of any markets of which the Council may thus become possessed.

Theatres and Music Halls.—To consolidate and amend existing Acts. To empower the Council to grant different kinds of licenses for (a) theatres, music-halls, concert and dancing rooms (b) places reserved for different classes of plays, spectacles, and entertainments. To regulate conditions of underletting; regulate sanitary works; revise and control condition of structures; with regulations against fire and accident. To control the arrangement and seating of visitors and their numbers; secure proper approaches, with adequate means of ingress and egress, provide for lighting passages; confer powers of constant inspection, and to appoint inspectors. The Bill provides that no such building shall be opened until the Council's certificate shall have been granted; that advertisement be made before building is begun, that no structural alterations be made until the plans are approved by them, and that no license for the sale of liquor shall be given before the premises are duly passed as fit for reception of the public.

Water.—To enable the Council, with a view to the future supply of water to London and the neighbourhood, to purchase by agreement, or take on lease any lands, houses, &c., and also any waterworks, wells, waters, and rights to take or convey, or sell water, and any rights, &c., of any company formed for obtaining or supplying water, as they may deem desirable to so purchase or lease: to enable the Council to make contracts, for water supply, with any person, corporation, or company; and to themselves sell and supply water within the County of London and its neighbourhood.

General Powers.—For further powers to prevent, under penalty, the closing or stopping-up of streets, without their sanction, or in a way to which they have not consented. To authorise the use of fire-hydrants by the Council and other local authorities for flushing and other purposes, and provide for a re-adjustment of the cost of their maintenance. To provide for the lighting of staircases and passages in artisans' dwellings and similar tenements, where open at night and used in common by occupiers—the owners, under penalty, to keep the same lighted during the stipulated hours (see also above). To confer further powers as to by-laws for preventing or regulating the conveyance or placing of explosives, or other dangerous articles, on the Council's ferry-boats, and for appointment of persons to examine and open packages tendered for conveyance, with powers to arrest offenders. To prevent, under penalties, the introduction of injurious or obstructive matters into their sewers, and for preventing the sweeping, raking, or placing of soil, rubbish, mud, or other refuse into or near sewers or drains, and on or near gratings, and for similar purposes. For further powers with respect to polling districts, stations, and places, and to enable the Council (a) to rearrange polling districts for their own elections; (b) to make and alter regulations with regard to applications for the alteration of polling stations; and (c) to arrange polling districts for Parliamentary and County Council elections where the borough is—as well as where it is not—in one petty sessional division.

With other Bills relating to London, the Thames, and the provinces we will deal in a further notice.

AMERICAN ROOFING SLATES IN IRELAND.—According to a recent report of the United States Consular Agent at Londonderry, one of the largest contractors in that district, who has had a cargo of Pennsylvania roof slates, asserts that for colour—deep sea green—quality, and uniformity of dimensions, these slates are superior to any others imported. They are entirely free from pyrites, possess extraordinary toughness, and are the most desirable slates for every description of roofing for exposed positions.

THE ELLIOTT'S SMOKE AND FUME ANNIHILATOR.

THE history of this invention is interesting, as it shows the struggles of an inventor with the difficulties besetting him in carrying on his own business. Mr. Elliott, of Newbury, is the proprietor of the steam joinery works which are well known, and the difficulties which arose between him, the local bench of magistrates, and his neighbours, owing to the smoke from his factory chimney, first turned his attention to the question of smoke abatement. It is now eight years since the experiment of washing the smoke first occurred to the inventor, and during that period continuous experiment has led to the improved apparatus which was shown in operation last week to a large party of engineers and members of the Press and others who were invited to witness the experiments with the annihilator at the works of the Birmingham Mint. This factory-chimney had for a long time been a trouble to the firm and to the owners and occupiers of adjoining property, and it gave the opportunity for severely testing the powers of the annihilator.

The apparatus is not complex in its arrangements, and may be briefly described as a chamber of moderate dimensions into which the smoke is drawn by a fan revolving at great speed. The chamber is fitted with revolving perforated paddles, which dip a few inches into water at the bottom of the chamber; the consequence is that the smoke is rapidly churned into the water, which immediately absorbs the acid fumes, the carbon, and other dusty particles. The smoke being at a high temperature, raises that of the water in the chamber, and the steamy vapour that is carried either again into the chimney-shaft or allowed to pass into the air at a lower level is no more noxious than the steam from a locomotive which may be met with on any bridge. The interference with the draught of the furnaces by the fixing of the apparatus required a considerable amount of thought, and the adjustment of the extracting-fan, driven by a belt, became a matter of some importance. This adjustment has now been accomplished, and it is claimed for the invention that high chimneys may be dispensed with. In developing the qualities of the apparatus, the value of the residual products did not receive much attention, but it seems probable that these may prove a considerable source of income and a valuable adjunct to the scheme, which is about to be undertaken by a limited company. The product from the apparatus is in the form of a liquid, frothy, black substance; the solid derived therefrom is a very fine putty substance, which seems able to command a sale amongst printers' ink and pigment manufacturers. The liquid is also valuable, being highly charged with chemical qualities, and this, it is said, has already been proved to be useful as a powerful disinfectant, and to have considerable properties as a fertilizer for agricultural purposes.

The presence at the experiments at Birmingham of those connected with agriculture and coal-mining testifies to a considerable amount of interest in the development of this invention. As to the disinfecting and fertilizing qualities, the statements of those interested can only be accepted with caution, as the experiments and demonstrations will be awaited with interest in this direction, and there is likelihood of further developments. The annihilation of smoke from factory chimneys can be more definitely spoken of after the Birmingham experiments. The invention undoubtedly grapples with the difficulty and overcomes it in a thorough manner by agencies which are simple in themselves. The matter may be of considerable importance to coalowners, as many of the inferior qualities of coal have hitherto been unsaleable owing to the resulting sulphur fumes and smoke producing an intolerable nuisance; but if this invention will facilitate the use of an inferior quality of coal, it may be to the equal advantage of the coalowner and the consumer, and indirectly to the public at large, in deferring the exhaustion of the country's coal supply. The experiments at Birmingham dealt exclusively with the annihilation of smoke from factory chimneys, and though it is claimed for this invention that it may be adapted to private dwelling houses, until further demonstration scepticism on the point at present may be excused. The abolition of smoke from factory chimneys is, no doubt, a step in the direction of fog abolition, but the smoke of the innumerable domestic grates will require to be coped with before that can be attained.

Mr. Elliott and his friends hope to make profit by the invention and the sale of the products. It is undoubtedly an invention with a future before

it, and if the rights of the patent can be maintained, and the concern be carefully managed, it should bring its reward to the promoters.

MAGAZINES AND REVIEWS.*

THE *Art Journal* contains the continuation of "A Painter's Pilgrimage" by Mr. Schmalz, the illustrations to which are chiefly concerned with architecture in the Holy Land, while Mr. G. C. Haité's second article "On the Arun" is accompanied by some pretty sketches of scenery and old buildings. Mr. B. C. Seward contributes an illustrated article on "Ancient and Modern Altar-Cloths," and Mr. Aymer Vallance a well-timed one on "Hints for Buyers of Gifts" in the way of personal jewellery, in which he repeats the condemnation we have often given of the foolish fashionable use of diamonds and other precious stones arranged in imitation of natural objects, and shows some examples of a better taste. This is to little purpose however; women in these matters prefer fashion to good art, and men who buy gifts of jewellery for them will in most cases choose accordingly.

In the *Magazine of Art* Mr. Telbin treats the question of "Art in the Theatre" partly in the way of a criticism of Mr. Herkomer's recent proposals in the same journal; not that Mr. Telbin entirely differs from Mr. Herkomer, but that the latter is not alive to the difficulty of carrying out in a large public theatre alterations of the received methods which it may be easy to practise in a small private theatre. Mr. Telbin defends the footlights, and states that his experience of a definite attempt at side-lighting the stage was that the result was most unsatisfactory. To our thinking the great value of the footlights is that they interpose a slight veil between actors and audience, and give a slightly unreal effect to the scene, taking it out of the likeness to everyday life. Drama is not reality, and we do not want it to be so. Mr. Telbin's practical criticism of Mr. Herkomer's diminishing proscenium opening is quite to the point. An article on the German sculptor Adolf Hildebrand, by Miss Helen Zimmern, is accompanied by illustrations which show remarkable power and originality. Miss Harrison contributes a paper on "Myths of the Dawn on Greek Vase Paintings," with illustrations.

A short paper on Etching in the *Studio* is accompanied by some slight etchings of architectural subjects by Mr. C. J. Watson which are admirable, especially one of the façade of St. Etienne du Mont. An article on bookbinding and Mr. Cobden Sanderson is an amusing specimen of the now fashionable worship of this bookbinder, who seems to be taken as a critic of life generally, and who in this article informs his interviewer that the expense of binding by his hand-labour method is not "too dear for ordinary purposes," because "we have no need of a multitude of books"; i.e., we are to be content with a very few books, in order that we may be able to afford Mr. Cobden Sanderson's bindings. No one loves beautiful bindings more than we do, but we are still of opinion that the contents of a book are more important after all than its cover.

In the latest number of the *Architectural Review* Mr. R. D. Andrews concludes, we presume, his articles on the "Use of Precedent in Architecture" with the dictum that the "broadest use of precedent is self culture," with which we shall not disagree; we cannot quite follow him in the praise which he gives to the Crane Memorial Library at Quincy, and the Monadnock building at Chicago, as buildings which are satisfactory and original wholes without being in the bonds of precedent; we should not call the Crane Library a remarkable building, and the Monadnock is only remarkable for its height and its defiant omission of any attempt at "architectural features." We doubt if this defiant omission is any architectural advantage; all that can be said is that an erection of such height is safe to be impressive, in a way, however poorly treated. The illustrations in the number are largely geometrical drawings; elevations of the Life Building, New York, by Messrs. Carrère and Hastings, which we cannot admire—it is what we should call rather coarse Renaissance work; and a detail elevation of a terra-cotta front of a carriage warehouse in Philadelphia, by Messrs. Cope and Stewartson, which is a good deal

more refined, and shows detail suitable for terra-cotta. The details of the City Hospital at Poston, by Mr. Wheelwright, the City Architect, are quite unexceptionable, but it may be a question whether there is enough in them to have been worth illustrating.

In the *Cornhill Magazine* a long and well-written article on "January Days in Ceylon" is partly occupied by an account of the remains of the ancient city of Anuradhapura.

In *Macmillan's Magazine* an article on "The New Athens" gives a sketch of the Athens of today, the ancient charm of which the author regards as by no means destroyed by modern changes. He comments on the fact that, while the French and German Governments subsidize their respective "Schools" at Athens, the British Government declines to do so; and in reference to the conclusion that our "School at Athens" had better have been founded at some archaeological centre where the ground was less occupied, he shows, we think, the reasonableness of his conclusion that "no other place could have been chosen for the British School without sacrificing advantages elsewhere unattainable." We may also recommend to the reader who can take interest in such discussion an article in the same magazine on "Descriptive Music," or rather against it, urging that music has its own powers of expression without attempting to trench on what is properly the field of painting.

The *Atlantic Monthly* devotes a short article to some word-painted landscapes, "Western Landscapes," by Mr. H. Garland, substituting short descriptions for pictures; a fancy which is not worth very much. In an article on "Ideal Transit" the writer sketches a possible future of electric travelling, in which great speeds are to be attained by conveyances all travelling at the same speed and kept at equal distances. That would have its advantages, but it would destroy the individuality of the express train travelling, and reduce everything to a dead level which might be safer but would be most uninteresting.

In *Harper* Mr. Nelson Page gives a pleasant sketch of Virginia and its country, houses, and people, under the title "The Old Dominion." The same number contains the continuation of "The Comedies of Shakespeare," commented on by Mr. Lang and illustrated by Mr. Abbey, this month's being "The Two Gentlemen of Verona," Mr. Abbey's illustrations of which by no means satisfy us; in the study of costume he seems to have lost the interest in the actual characters, except in the case of "Lance and His Dog," which is a good conception.

The *Century* is a good deal occupied with Rembrandt, on whom there are two or three short articles, with some illustrations. In this journal we have the same fancy as in *Harper* of "a set of sketches" of imaginary scenes, but they are illustrated to the eye also, with a more satisfying result.

In *Scribner* Mr. Marquand gives an article on "A Search for della Robbia Monuments in Italy" which has the merit at least of being remarkable even among the leading American magazines for the protusion and beauty of its illustrations. "The Artist among Animals," by Mr. F. H. Church, is an animal-painter's account of some of his experiences, illustrated by a number of sketches. An article on "Constantinople," by Mr. Marian Crawford, with illustrations by Mr. E. L. Weeks, is published in the same number.

The *English Illustrated* contains "An Impression of Venice," with a number of very good illustrations. In a general way this magazine is not keeping up its former prestige in an artistic sense; some of the illustrations, notably those to the "Ballad of the White Lady," are very bad. A short article on "Ancient Earth-works at Casterbridge" is rendered interesting by photographs taken on the site, showing the actual state of the ground.

In the *New Review* Mr. J. A. M. Macdonald, M.P., treats the question of the unemployed in an article more moderate and reasonable than is usual with those who, as he does, advocate State interference. Professor Max Müller gives a short sketch of "Constantinople in 1893."

The *Fortnightly* contains an article on "The Unemployed," by Canon Barnett, which is by far the most sensible and practical contribution to the consideration of this subject which we have come across, and we strongly recommend it to the attention of all who are interested in the subject.

To *Longman's* Sir John Evans contributes an article on the "Forgery of Antiquities," which is not only interesting in itself but may serve the purpose of putting the too credulous collector on his guard on many points connected with his

pursuit. Mrs. Percy Frankland contributes a short article on "Water Bacteriology and Cholera."

The *Gentleman's Magazine* contains an article by Mr. E. O. Walker on "A Visit to Rameswaram," with a description of the temples, and the legends connected with this holy place of Southern India.

To the *Nineteenth Century* Mr. Hugh Percy Dunn contributes an article which is of interest to Londoners of all professions, viz., "What London People Die of." Among other things, the writer concludes that the close indoor work to which many Londoners are subjected has not by any means so deteriorating an effect on the physique (except in appearance) as might have been expected. He admits that the inherited bad effects may be serious after some generations. Mr. Theodore Bent's article on "The Origin of the Mashedland Ruins" we have referred to elsewhere.

A *Beautiful World* is the title of a small quarterly publication which has been started by the "Society for Checking the Abuses of Public Advertising" to assist their cause. The most amusing thing in it is the article on the speeches on the subject made at a dinner of the "United Billposters' Association," a short time since, ample quotations from which are given. The draft of a Bill to regulate public advertisements is included in the contents.

The *Illustrated Archaeologist* contains an article by Mr. Goudie, F.S.A., on "The Excavation of a Pictish Tower in Shetland," or rather what the author assumes to be a Pictish tower, as that is one of the points in dispute. Photographs of remains are given showing their actual state, as well as a plan. The article on some old towers at Liège, by Mr. Arthur Elliot, is illustrated by sketches that are of considerable architectural interest. The editor (Mr. Romilly Allen) contributes an article on "The Celtic Brooch, and how it was worn," accompanied by illustrations of some very fine examples.

In *The Antiquary* a review of Mr. Carew Hazlitt's book on European coins gives occasion for the production of some illustrations of remarkable coins. The other articles of interest to us are mostly the serial ones which we have called attention to before on various subjects. We learn from "Notes of the Month" that Miss Emma Turner's bequest of 2,000*l.* to the trustees of the British Museum, to enable them to conduct excavations for Greek, Roman, or Oriental antiquities, is to be used in exploring the site of Amathus in Cyprus.

SANITARY INSPECTORS' ASSOCIATION:

IN-SANITARY AREAS.

At the monthly meeting of this Association, held on Saturday last, the President, Sir Benjamin Ward Richardson, in the chair, a paper which had been prepared by Mr. Alderman Beachcroft, L.C.C., on "Insanitary Areas," was read by Mr. H. Alexander in the absence, through indisposition, of Mr. Beachcroft. By the term "insanitary area" the lecturer described an area on which houses were built too defective for repair, and so ill placed that nothing short of demolition and reconstruction could bring them up to a proper sanitary standard. The Commissioners of Sewers in the City of London, and the Board of Works in the remainder of the metropolis, had spent 1,500,000*l.* on twenty different schemes of demolition and reconstruction between 1876 and 1888, and the new authority, the London County Council, under the Act of 1890, had undertaken one large scheme of the same kind in Bethnal Green. The cost was enormous. On this latter site 5,700 had been formerly housed, and 4,700 had to be rehoused, 1,000 providing for themselves elsewhere. The net cost was 280,000*l.*, or at the rate of 60*l.* per head. The cost of the various schemes varied between 21*l.* per head in Lambeth and 108*l.* in St. Giles's, the average of the schemes devolving upon the London County Council to execute being 90*l.* per head. The most unsatisfactory feature of large clearances was that those who were temporarily housed elsewhere often did not get back to the renovated sites, although the Council had done its best to secure that result. The author remarked that "had it been possible to condemn the whole area without purchase, and, while insisting that every house should be permanently closed, to provide cottages in a suburb for all the occupants, it would have been cheaper for the ratepayers to have given the cottages rent free, and even to have supplied free travel to and from London for the bread-winners, than to carry out the present scheme."

* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been noticed is not noticed, it is because that number contains nothing that it is within our province to comment upon.

COMPETITIONS

The smaller schemes which were being carried out by the County Council in various districts of the metropolis were free from many of the objections to which large schemes were open, but it was greatly to be feared that the Council would not be able to help itself in the matter in the face of the multiplication of condemnations of large areas, such as that of Somers Town. Here the Council had decided to clear an area which housed 1,266 persons, but the site would only accommodate 650 persons in the new buildings and the cost would be 100*l.* per head. In London, as a whole, the density of population was not inordinate in comparison with other town sites, but that was the result of including 7,000 acres absorbed by the public parks and the numerous squares and gardens. The total acreage of London showed a population of 54 persons to the acre, against 116 per acre in Liverpool. But taking separate districts, St. George's, Southwark, had 210, and Whitechapel and Holborn each 200 per acre. The density would increase with the multiplication of large blocks of dwellings. The 10 acres of the Millbank site were to accommodate 3,700 persons, or 370 per acre, about half the density calculated upon by the company presided over by Sir Sydney Waterlow. If such a state of things became general in London, the result would not fail to be disastrous. All these glaring defects had been caused by the absence of proper building regulations. Small houses, of single or of two stories, with large gardens, had almost disappeared. The new buildings put on the sites were three or four times the height of the old ones, and the height had no relation to the width of the surrounding streets. Up to 1855 there was no minimum width for streets, and till 1862 no maximum height for buildings; but in 1878 a great improvement was effected by the regulation requiring every house to be set back at least 20 ft. from the centre of the roadway. The lecturer contended that the time had come when Parliament should be asked to prevent the erection, whether on old or new sites, of any dwelling houses unless adequate provision was made for air spaces, both front and back, in proportion to the height of the house. In nearly all the provincial towns the Model By-laws of the Local Government Board were in force, and they ought to be extended to London. The County Council ought in future, when areas were proved to be insanitary, to proceed not by way of the power it now has of possessing by way of a clearance scheme, but also by way of closing orders and demolition, leaving owners to rebuild, subject to the proposed new restrictive provisions as to setting back and the provision of air-space in the rear.

At the conclusion of the paper, Sir Benjamin Richardson said that the proper cure for the overcrowding of London was to make it flow over into the fields and gardens outside. They must, in short, go back into the country. Without healthy plant life there would be no healthy human life, and therefore every dwelling-house should have its own garden.

A vote of thanks was accorded to Alderman Seachroft for the paper.

Mr. Thomas (Chairman of the Council), Mr. West (Walthamstow), Mr. H. Alexander (Shoreditch), Mr. Dee (Westminster), and others took part in the discussion.

At the meeting it was unanimously resolved to memorialise the Local Government Board in favour of the introduction of clauses into the Local Government Bill, 1893, for the following purposes:—

- (1.) That sanitary inspectors shall give their whole time to the duties of their office.
- (2.) That sanitary inspectors shall be elected to permanent tenure of office—and only to be dismissible for proved misconduct or incompetence.
- (3.) That sanitary inspectors shall serve notices for the abatement of nuisances, and that such notices shall be a basis for legal proceedings, if approved by the local authority.

THE THAMES CONSERVANCY.—The Conservancy board will shortly remove from 41, Trinity-square, where they were established nearly forty years ago, to new offices on the Victoria Embankment. These have been built (of red brick, with stone dressings and doorway) next west of St. College, with their front in Carmelite-street, by Messrs. G. Trollope Sons, contractors, after the designs of, as we are informed, Messrs. Hunt & Steward, architects.

BRICKMAKING, GAINSBOROUGH.—A new industry at Gainsborough has just been started, viz. that of brickmaking on a large scale. The clay is taken from the banks of the Trent, and the new undertaking is known as the Trentholme Brick and Tile Company.

PUMP-ROOM EXTENSION, BATH.—At the meeting of the Bath Town Council on Tuesday, a report from the Baths and Pump-room Committee on the proposed extension of the Pump-room was presented. The report stated that fourteen sets of competitive designs were sent in for the proposed extension of the Pump-room, and that the President of the Royal Institute of British Architects was, in accordance with the suggestions of the Committee, asked to name an assessor to advise the Committee with reference to the distribution of the premiums offered for the three best designs. The President nominated Mr. A. Waterhouse, R.A. The plans had been opened in the presence of the mayor and the Chairman of the Committee, and as each set was unpacked, each drawing, together with the envelope containing the author's name and the report, was marked with a letter of the alphabet. Subsequently these letters were sealed in an envelope and deposited with Prescott, Dimsdale, Cave, Tugwell & Co., Limited. After hearing Mr. Waterhouse's explanation of the various designs, the Committee resolved to recommend that the premiums be awarded as follows: The first premium of 100*l.* to the author of the design marked "K," the second premium of 75*l.* to the author of the design marked "O," and the third premium of 50*l.* to the author of the design marked "I." The Committee did not, however, recommend that the design to which the first building was awarded be adopted for the new building is not in their opinion suitable to the site. 2. The treatment of the Roman bath is, in design "O," in their opinion preferable to that in design "K." They recommended that subject to the approval of the Local Government Board being given and a tender obtained for the work approximately near the author's estimate of about 26,000*l.*, the building be erected in accordance with the design marked "O," subject to some modifications to be hereafter arranged between the assessor and the author of the design. The Town Clerk read a letter from Mr. J. Macvicar Anderson, the President of the Royal Institute of British Architects, in which he said that he was aware that in departing from the usual procedure of recommending the appointment of the author of the first premiated design to be the architect of the building, the Committee were technically within the lines defined in the conditions of competition. But one of the strongest inducements with architects to enter a competition was the appointment of a professional assessor, because the mere fact of such appointment was assumed to imply that the competition would be decided in accordance with his advice, in spite of any saving clause to the contrary. Were this not so the inducement would not exist. If, in an important competition like that for the proposed extension of the Pump-room, the selection of so experienced and competent an assessor as Mr. Waterhouse, made without hesitation, was virtually set aside, the confidence by the architectural profession in respect of the appointment of assessors in future competitions could not fail to be rudely shaken. It was because he deplored such a result that he regretted the decision at which the Committee had arrived, and he ventured, therefore, to urge the Council to give the matter grave consideration before confirming the action, the consequence of which would inevitably be serious.—Mr. Radway, in moving the adoption of the report, said, on behalf of the members of the Baths Committee, that if they entertained one strong point with regard to the competition, it was that they should have the right and the privilege of selecting from the three premiated designs such an one as, in their wisdom, most commended itself to their judgment. He met Mr. Waterhouse before he saw the drawings, and before he moved one step in the direction of acting as assessor. After a little discussion Mr. Waterhouse remarked: "I see you have a clause in the conditions of competition that if I had seen earlier I might perhaps have hesitated to undertake the assessorship." The clause to which he made reference was that the Baths Committee should recommend to the Council what in their judgment most commended itself.—Alderman Jolly seconded, and the resolution being agreed to, the report of the Committee was adopted. The Mayor then opened the envelope of the design "O," when it was found to be empty.—Major Davis, the City Surveyor, then handed a letter to the Mayor, who refused to open it.—Major Davis said he had handed an envelope in, and if the Mayor would open it it might explain something.—The Mayor took the vote of the

Council as to the desirability of opening the envelopes of the other premiated designs, but the Council refused to adopt this course.—Mr. Radway said the Committee, as well as himself, had taken the greatest possible pains in creating a competition that should be above criticism. A set of drawings, sent too late to the Town Clerk's office, was immediately ordered by the Committee to be thrown out of the competition, and in the present case, in honesty to themselves and to their fellow citizens, he thought they should discard the plan.—Alderman Marshall said the Council had accepted the plans. He suggested that it might be an error of the architect's clerk to omit to put the card in the envelope.—The Mayor, in reply to a question, said there had been no tampering with the seal. After an animated discussion, Mr. Tonkin seconded Mr. Radway's amendment to adjourn the opening of the other envelopes for a week. This was agreed to.

UNION INFIRMARY, SUNDERLAND.—Sixteen sets of competitive plans were sent in for the proposed Workhouse Hospital at Sunderland, and Mr. Binyon, architect, was appointed assessor. He has awarded the first premium (50*l.*) to No. 10; the second (35*l.*) to No. 3; and the third (15*l.*) to No. 6; and highly commended No. 5. The names of the successful competitors are:—First, Mr. Joseph Shields, of Sunderland; second, Messrs. Ellison & Sons, Liverpool; third, Messrs. Bolton & Fox, Dewsbury; and No. 5 was by Mr. John Eltingham, of Sunderland.

ARCHITECTURAL SOCIETIES.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—At the Yorkshire College, on the 4th inst., Professor Goodman, C.E., gave a practical demonstration, in the presence of members of this Society, of testing materials used in the construction of buildings. Mr. G. Bertram Bulwer presided. The members were conducted to the engineering department, where the testing and other machinery is situated, and there Professor Goodman made a number of tests, and gave information relating thereto.

LIVERPOOL ARCHITECTURAL SOCIETY.—The third ordinary meeting of the present session of this Society was held on the 4th inst. in the Royal Institution, Colquhoun-street, under the presidency of Mr. Keef, vice-Chairman. The principal item of the evening was the exhibition, by Mr. G. E. Thompson, of the Liverpool Amateur Photographic Association, of a series of lantern slides illustrative of English and Continental architecture.

NORTHERN ARCHITECTURAL ASSOCIATION.—The winter session of this Association was inaugurated, on the 4th inst., at the Art Gallery, Newcastle, by an opening address from the President, Mr. J. H. Merriam, F.R.I.B.A. In the course of his address the President said that they were able to congratulate one another that the work of the past year had not been marred by any general or combined strike in the building trade, but that on the contrary there had been a great amount of quiet activity throughout the kingdom; an activity which they trusted would be of long continuance. He noticed that the President of the Institute, in his opening address, said that "Architects have been sometimes reproached with incapacity because they fail to attain an ideal, which the public chooses to establish," and because they had "not created a new style of architecture." As they existed in a great measure by the approbation and support of the public, it was obvious that for business reasons they were obliged in some measure to consider its criticism. But though this proposition might hold good in a limited sense, they must not forget also that there was criticism and criticism. It was not for them to submit meekly and blindly to the dictation of vulgar and captious censorship. It was not to be denied that an advanced knowledge of their art had even been restricted to a comparatively small portion of the community. In deferring to public criticism they must therefore be satisfied that the counsel given was just, and the product of a cultivated mind competent to instruct. The architect should never lose sight of the dignity of his calling or of the aspirations which aroused in him the desire to devote himself to noble works. It was for him to remember that while no man should be above the help of criticism, the latter must proceed from the well-informed who had mastered something more than a feeble smattering of the art of architecture, and who were qualified to judge of excellencies, to point out shortcomings, or suggest improvements. In modern times one style after the other had

passed into vogue; and, like everything which was the result of ephemeral fashion, had after a while been almost, if not altogether, discarded, without leaving any deep or lasting impression on the national architecture. It was admitted that the exclusive study of any one style was apt to result in mere servile imitation, which was so injurious to art. Therefore, it was the mind drawing its inspiration from every source which was the best capable of producing, through the process of its crucible, great and original results. The true mark of progress in the present day was that, generally speaking, they were students and patrons of all styles; and this practical freedom, together with the requirements and inventions of the age, was perceptibly changing the expression of our architecture, and giving it, so to speak, a kaleidoscopic variety, and a character of its own. They were informed that a Bill for the Legal Registration of Architects had again been introduced into Parliament, and that the Institute had again lodged a petition against the measure. Much might, of course, be said both for and against the question, but the statement that "by adopting a registration bill we are sacrificing our independence and are dragged into the vortex of legislation" was deserving of serious consideration. It was a dangerous thing to experiment with State legislation, unless the urgent necessity for it was demonstrated, and the utility was evident; and it must be borne in mind that the demand for registration had not been forced upon them by the general public, and that it had not originated from their most prominent architects. In regard to the changed conditions of labour in connexion with the various tradesmen entrusted with the execution of designs, the subject, though not a new one, was deserving of some consideration. They were told that the mutual feeling of confidence and interest which formerly existed between employer and workmen had in a great measure disappeared, and that some of the regulations of the trades unions had a tendency to bring down the best workmen to the standard of the average, and to grind them down to a dead level. The causes he had alluded to, combined with the decline of the apprenticeship system, had resulted in increasing the difficulties of architects, as well as contractors, in the execution of satisfactory workmanship. The rapid improvement in machinery, together with the fact that some employers were unwilling to take apprentices, might have had some influence in changing those conditions. It was expected by many that technical education would be the compensating medium for some of the changes or defects mentioned. It must be allowed, however, that no trade could be properly learned out of the workshop; although the men would certainly understand better the instruction given in the workshop if they had had the benefit of a theoretical foundation before proceeding to practice. It was useless to expect the technical school to entirely replace the apprenticeship system, but having laid the foundation before entering the workshop, the technical education of the artisan might go on contemporaneously with the workshop employment. Many workmen, of excellent practical skill, worked entirely by rule of thumb, and their efforts would assuredly have more successful if guided by the enlightenment and precision of scientific knowledge. Thus technical education might be the means of exalting labour, and of enabling capable workmen to raise themselves to a higher standard by the acquisition of a more perfect knowledge of the art of building in all its details in relation to architecture. Another question which claimed consideration was that of the disfigurements of streets and buildings with advertisements, sky-signs, signboards, and bill-posting of all kinds. It was a matter of congratulation that the Newcastle Corporation intended to limit in some measure an abuse which had outgrown toleration. The Council of the Leeds and Yorkshire Architectural Society had recently considered the matter and obtained from various Continental cities information respecting their methods of regulating the posting of bills and mural literature of all sorts upon erections in the streets of their cities. Copies of the information thus obtained, together with a memorial embodying the views of the Leeds Architectural Society were submitted to the Leeds Council authorities, and were gratefully acknowledged by them. The President also referred to the condition of the Association, the courses of study available for young members, and the importance of a study on the spot of Continental art and architecture. On the question of competition, he said that professional assessors should always be supported, as far as possible,

and added: "It is only where we fear the result is arrived at in bad faith, and the integrity of the committee is suspected that our services are necessary, and will ever be found to support the interest of our art." Mr. E. Eugene Brown, M.I.E.E. (of Messrs. J. H. Holmes & Co.), read a paper on "Electric Lighting." At the close, votes of thanks were given to the President for his address, and to Mr. Eugene Brown for his paper.

CARTISIE ARCHITECTURAL, ENGINEERING, AND SURVEYING ASSOCIATION.—At a meeting of this Association held on the 29th ult. in the Town Hall, a paper was read by Mr. R. Calderwood entitled, "Mapping and Contouring." The lecturer pointed out the great difficulties which have to be contended with in the carrying on of a large survey—through atmospheric conditions and the roundness of the globe, and showed sketches and gave an outline of the manner in which the national surveys have been carried on, and the method of measuring arcs of the earth by Snell's system of triangulation. He showed what an important part astronomy bears in such surveys, and the wonderful accuracy with which long distances may be measured by trigonometrical surveying.

ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS.—At a meeting of the Society of Engineers, held at the Town Hall, Westminster, on Monday evening, Mr. William A. McIntosh Valon, J.P., President, in the chair, a paper was read by Mr. Perry F. Nursey, past President, on "Some Practical Examples of Blasting." The author said that his own practical work commenced in 1872, with the demolition of a 20 ft. span masonry bridge and a military structure at Quenast, in Belgium, in the presence of the Ministers of the Interior and of War, the explosive used being lithofracteur, a nitro-compound. In the following year he removed some rocks for the late Sir John Coode in connexion with the works of the Jersey harbour, and also at Douglas, Isle of Man. Besides small blasts, the author described two carried out at Jersey with 50 lb. charges, and one with a 115 lb. charge of lithofracteur, all under water. As a result, the author stated that the latter charge dislodged at least 400 tons of dense syenite rock, being at the rate of about 33 tons of rock per lb. of explosive used, which is a fair average of what such an explosive should do, and which he showed was done in independent practice. The latest operation carried out by the author was the demolition of one of Brunel's brick bridges over the Great Western Railway in a deep cutting at Reading. The work was done in connexion with the widening of that line, and the bridge, which was 21 ft. wide, consisted of three arches of 31 ft. 6 in. span each. The author described in detail the process of demolition, which was effected by means of 13 lb. 12 oz. of carbo-dynamite, disposed in twenty charges in the crowns and haunches of the arches.

THE INSTITUTION OF CIVIL ENGINEERS.—At the ordinary meeting of the Institution of Civil Engineers on the 5th inst., Sir Robert Rawlinson, K.C.B. (Vice-President), in the chair, it was announced that twenty-three Associate Members had been transferred to the class of Members, and sixty-nine candidates had been admitted as Students. The first ballot for the Session 1893-94 resulted in the election of seven Members and 122 Associate Members, and of two Associates.

ARCHÆOLOGICAL SOCIETIES.

SOCIETY OF ANTIQUARIES OF SCOTLAND.—The annual general meeting of the Society of Antiquaries of Scotland was held in their library, Queen-street, Edinburgh, on the 4th inst., Mr. J. R. Findlay in the chair. Sixteen new members having been balloted for and admitted, the office-bearers and Council for the ensuing year were elected. The list of members deceased since last annual meeting included two honorary members and twenty-five Fellows, among whom were Mr. Francis Abbot, who had been for forty years a Fellow, and served successively on the Council, and as curator, librarian, and vice-President for more than thirty years; and Dr. Alexander Laing, of Newburgh, author of "The History of Lindores Abbey," who had been a Fellow for thirty-four years, and had also served on the Council. The number of new Fellows admitted last year had been forty, and the total number of Fellows now on the roll was 720.

NEWCASTLE SOCIETY OF ANTIQUARIES.—A monthly meeting of members of the Newcastle

Society of Antiquaries was held, on the 29th ult., in the Castle, Newcastle. Mr. John Philipson presiding. Mr. J. P. Gibson had undertaken to read "Notes on the Roman Military Organisation and the Romans' Daily Life in Northumberland," but he was unable to be present, and Mr. W. W. Tomlinson read a paper on "The Advertisement Columns of Old Newspapers," and Mr. W. L. Charlton read "Notes on Hlesleyside MSS.," which had been prepared by himself and Mr. O. J. Charlton.

APPOINTMENTS.

CITY ARCHITECT, DUBLIN.—The ordinary monthly meeting of the Dublin Corporation was held on the 4th inst. in the City Hall. The first business brought before the Council related to the election of City Architect for a period of one year, pursuant to and upon the terms and conditions contained in the report of the committee of the whole house and adopted by the Municipal Council at a meeting held on November 6, 1893. The following are the names of the architects who appeared before the Council as candidates:—J. F. Beardwood, 16, Leinster-road, Rathmines; J. Kelly Freeman, 30, College Green; Charles J. McCarthy, 25, Suffolk-street; Laurence A. McDonald, 54, Dawson-street; A. J. M'Goughlin, 4, Adelaide-terrace, Glenageary; Ernest H. Morris, 59, Marlborough-road; Michael Tighe, 8, Upper Sherrard-street; W. Cranwill Wilson, City Hall. On the first ballot the voting was:—Beardwood, 10; McDonald, 15; McCarthy, 13; Wilson, 6; Freeman, 5; Tighe, 2; Morris, 1. On a second ballot being taken with reference to the three first names, the result of the voting was as follows:—McDonald, 23; McCarthy, 18; Beardwood, 17. A final ballot was then taken between Mr. McDonald and Mr. McCarthy. The result was:—Mr. McCarthy, 30; Mr. McDonald, 28. The Lord Mayor then declared the former duly elected.

MASTER OF WORKS, PAISLEY.—On the 4th inst. at a meeting of the Paisley Town Council in Committee, Mr. J. W. Moncur, C.E., Perth, was appointed burgh master of works. The salary attached to the office is 250*l*. The vacancy was caused by the resignation of Mr. Robert Sharp. There were sixty-four applicants for the appointment.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held at the County Hall, Spring Gardens, on Tuesday, Mr. John Hutton Chairman, presiding.

The Tower Bridge and its Approaches.—The Improvements Committee reported that they had settled the London County Council (Improvements) Bill and the London County Council (Tower Bridge Southern Approach) Bill, and that they recommended that the seal of the Council be affixed to petitions for leave to bring in these Bills, and that they be deposited pursuant to the standing orders of Parliament with such verbal alterations, if any, in the Bills as the Parliamentary Committee might consider desirable.

The recommendation referring to the Improvements Bill was agreed to without discussion, but on the Tower Bridge Bill Sir John Lubbock, Bart., M.P., proposed to refer the recommendation back to the Committee. Mr. Martineau seconded the amendment, which, after some discussion, was rejected, and the recommendation was agreed to.

Lambeth Bridge.—The Bridges Committee reported in reference to Lambeth Bridge that since Sir B. Baker's report of April 2, 1887, the work which he then recommended for strengthening Lambeth Bridge had been carried out. The engineer had now stated that he considered the bridge safe, as no load was allowed to pass over the bridge which exceeded three tons weight, and as men were employed to watch the bridge day and night and to close the gates whenever there was a probability of a crowd assembling on it. The Committee had considered suggestions for strengthening the bridge by means of piling driven in the bed of the river, but they could not recommend this, as the cost would probably exceed 20,000*l*, and the piling would be an obstruction to the river traffic; moreover, the bridge must before long be entirely rebuilt. On June 14, 1892, they reported to the Council that in consequence of the unsatisfactory condition of the bridge, powers would have to be obtained at the next Session to rebuild it, and they at the same time proposed that Vauxhall Bridge should be repaired pending the rebuilding of that bridge in five years' time. The Council, however, &

not accept either recommendation, but referred them back to the Committee after several members had expressed the opinion that Vauxhall Bridge was more necessary than Lambeth Bridge, and therefore should take precedence of it. In consequence of this expression of opinion the Committee submitted to the Council on July 12, 1892, a scheme for rebuilding Vauxhall Bridge, and the Council decided to apply in the 1893 Session of Parliament for powers to remove the existing structure and to put another in its place. With regard to the rebuilding of Lambeth Bridge, the Committee were considering this question, and also that of making a new northern approach.

London Water Supply.—The Parliamentary Committee reported with reference to the preparation of a Water Bill, and they recommended "That the London County Council (Water) Bill in the form in which it has been circulated be approved; that the seal of the Council be affixed to a petition for leave to bring in the Bill; and that the Bill and petition be deposited pursuant to the standing orders of Parliament, with such verbal alterations (if any) in the Bill as the Parliamentary Committee may consider desirable."

After a short discussion the recommendation was agreed to.

Tenders.—The Main Drainage Committee submitted a revised report on the tenders which had been received for the supply of boilers at the Deptford pumping-station. The question at issue was whether the contract should be given to Messrs. Spur, Inman, & Co. or to Messrs. Yates & Thom. As the first-named firm had previously done work in a satisfactory manner for the Council, and as they paid the highest wages, the Committee recommended that although their tender was 24*l.* 10*s.* more than that of Messrs. Yates & Thom, the contract should be given to them.

Lieutenant-Colonel Ford, in the interest of the ratepayers and contractors alike, moved an amendment that the contract be given to Messrs. Yates & Thom.

Mr. Torrance seconded the amendment, which, after discussion, was rejected, and the recommendation of the Committee adopted.

Street Naming.—The report of the Building Act Committee contained the following paragraph, the recommendation being agreed to:—

"We have considered the petition of inhabitants of Great and Little Queen-streets, requesting that the order of July 11 last, directing the incorporation of the two streets as Atterbury-street, and the re-numbering of the houses may be rescinded, and we have also heard a deputation of the inhabitants upon the subject. We are now of opinion that under the circumstances the Council's order should be varied, and recommended."

"That 'Atterbury-street,' late Great and Little Queen-street, be re-named 'Old Queen-street.'"

Capacity of Water-closet Flushing Cisterns.—The report of the Public Health and Housing Committee contained the following paragraph, the consideration of which was adjourned:—

"Regulation No. 21 made by the water companies under the Metropolitan Water Act, 1871, provides that every water-closet cistern or service-box, fitted or fixed after the confirmation of the regulations, in which water supplied by the companies is to be used, shall have an efficient waste-preventing apparatus so constructed as not to be capable of discharging more than two gallons of water at each flush. The Local Government Board has forwarded to the Council a copy of correspondence that has passed between it and certain of the sanitary authorities of London and the water companies respecting a proposal that regulation 21 should be altered so as to provide that every water-closet cistern or service-box shall be so constructed as to be capable of discharging three gallons of water at each flush. The Board asks for the Council's observations on the subject. Many of the sanitary authorities consider that a two-gallon flush is inadequate, while the water companies contend that two gallons are sufficient when proper apparatus is provided, and that when the flush is unsatisfactory the reason for this is that the down-pipe from the cistern to the pan is too small a diameter, and the inlet into the pan also too small. This assertion, destroys the efficiency of the flush. The companies also state that to increase the size of the cisterns as suggested would involve an enormous increase in the quantity of water to be provided, and seriously affect the addition of undertakings and works of the companies in the occupation of dwelling houses. We . . . have made enquiries of six municipalities which control their own water supply, and learn that Edinburgh and Bradford have decided that three gallons should be required, while Leeds allows two-and-a-half gallons in special cases. At Glasgow, Liverpool, Leeds and Dublin, two gallons are used, but the city engineer of Dublin is of opinion that this quantity is

too low. We also asked the Sanitary Institute for their views upon the question, and have received from them a detailed report giving the result of a large number of experiments carried out by the Institute, and concluding with an expression of opinion that the regulation should be altered so as to provide for the construction of flushing cisterns capable of discharging not less than three nor more than three-and-a-half gallons of water at each flush. We took advantage of an opportunity kindly afforded by the Institute of seeing their experiments, and were impressed by the fact that the experiments were conducted under much more favourable conditions than are generally found in London houses. . . . With regard to the statement of the water companies respecting the effect of imperfect apparatus upon the flush, we recognise that there is an intimate relation between the conditions indicated by the companies and the amount of water required for flushing, but we must point out that it is impossible to condemn many kinds of apparatus now in use in London, although with only a two-gallon flush they are unsatisfactory. We are, therefore, of opinion that water-closet cisterns should be capable of discharging a three-gallon flush, and that regulation 21 under the Metropolitan Water Act, 1871, should be amended accordingly. We are advised that it would not be within the purview of the regulations of the water companies to prescribe a minimum capacity for flushing cisterns, but that section 30 of the Public Health (London) Act, 1891, enables the Council to make a by-law for this purpose, it should think fit. We therefore only propose to recommend that the minimum capacity should be increased from two to three gallons, which would at any rate enable the occupier of any premises to have a three-gallon cistern should he so desire. In addition to the above suggested amendment of regulation 21 there are a few other amendments of the regulations which we think should be made, and which we now submit:—
i. The requirements as to the supply of water to water-closets should apply equally to the supply of water to sinks used for receiving any solid or liquid filth. ii. By-law 3 made by the Council, under section 39 of the Public Health (London) Act, 1891, provides that every person who shall construct a water-closet in connexion with a building shall furnish such water-closet with a cistern of adequate capacity for the purpose of flushing, which shall be separate and distinct from any cistern used for drinking purposes. We think it necessary that a regulation shall be made which shall prevent cisterns being brought into use for supplying water for domestic purposes, or for food for beasts, so long as they directly supply any water-closet or sink used for receiving any solid or liquid filth. iii. We also think that in all cases where any premises have a constant water service there should be a requirement that one or more taps shall be provided for drawing water used for domestic purposes from the rising main. We recommend:—

"That the Local Government Board be informed that, for the reasons given in the foregoing report, the Council is strongly of opinion—(a) That regulation 21, under the Metropolitan Water Act, 1871, should be amended so as to read as follows:—'Every water-closet cistern or water-closet service-box hereafter fitted or fixed in which water supplied by the companies is to be used, shall have an efficient waste-preventing apparatus, so constructed as not to be capable of discharging more than three gallons of water at each flush.' (b) That the requirements as to the supply of water to water-closets should apply equally to the supply of water to sinks used for receiving any solid or liquid filth. (c) That a regulation should be made which shall prevent cisterns being brought into use for supplying water for domestic purposes, or for food for beasts, so long as they directly supply any water-closet or sink used for receiving any solid or liquid filth. (d) That in all cases where any premises have a constant water service, one or more taps should be provided in connexion with the rising main for the supply of water for drinking purposes."

Utilisation of Dust.—The following resolution was agreed to:—

"That inasmuch as the collection, disposal, and utilisation of the refuse of the County of London commonly called 'dust' is a matter of very considerable importance from the sanitary and financial point of view, as are also the conditions under which the men and women who are engaged in this work labour, the Public Health Committee be instructed to inquire into and report to the Council (1) as to the methods adopted by the various authorities in the County of London for the collection, disposal, and utilisation of refuse or dust; (2) as to the conditions under which the men and women employed in this work labour; (3) what alterations and improvements are advisable in the present system; and (4) what, if any, legislative powers are needed or desirable."

Prevention of Smoke.—The following resolution was also agreed to:—

"That whereas large manufacturing works situate outside the limits of the County of London, but immediately adjacent to the same, are not subject to the provisions of the Smoke Prevention Act, and the dense masses of smoke from the same are daily blown over London, it be referred to the Public Control Committee to consider and report how the Smoke Prevention Act can best be applied and enforced within the area outside but immediately adjacent to the County of London."

The Council adjourned soon after seven o'clock.

Illustrations.

THE "RED CASTLE" FLATS, ZURICH.

THIS extensive block of some forty tenements, which is popularly known as the "Red Castle," stands on a commanding site facing the embankment of the Zurich lake.

The position of this block is probably the most unique on the Continent for the class of building, as its aspect, besides consisting of the beautiful lake to the south, with the Alps in the background, includes a view of a park to the north, large private grounds to the west, and to the east the prospect of a similar view on to some pleasure grounds which are being formed in connexion with the new Assembly Rooms in course of erection, under the superintendence of Messrs. Fellner & Helmer, of Vienna.

As will be seen from the plan, the architects, Messrs. Ernst & Co., have attempted to combine the advantages of centralisation with those of isolation. The block has been divided up into nine practically separate buildings, with strong divisional walls between them, and in each case a separate flat takes up the whole floor, the number of tenants to each building hence being limited to four or five. Each flat is complete in itself, with the exception of the cellar and attic-rooms, but everything in the flat that requires motive power of any description is supplied from a central station situated in the main courtyard.

The heating throughout the block is by hot-water pipes, the lighting by electricity, a comprehensive system of taps and switches respectively greatly facilitating regulation. The system of ventilation, which is a very complete one, likewise admits of exact regulation in each room, and the gas service, which has only been laid on for kitchen use, can also be specially treated as regards pressure, &c. The large passenger lifts which have been provided in most of the staircases are worked by hydraulic power, likewise the coal lifts which run up to the different kitchens, and the letter-box lifts, thanks to which the postmen need not lose time with ascents to every tenement, but can leave their packages in the outer vestibules of each house, knowing that they will easily reach the library of the tenant for whom they are intended without passing a third party's hands—as, for instance, those of a hall porter. The kitchens, bath-rooms, and lavatories are well supplied with cold and hot water, the latter service like the others, being direct from the central station, and not from the usual boiler in connexion with the kitchen range. Each tenement has its dust-shoot, the accumulations from which are at once destroyed at the central station, being used as fuel, all unpleasant fumes being carried off through a high factory chimney at the back of the block. A great feature of these flats is the large amount of storage space in wall-cupboards, built on the Swedish system. These, together with the numerous chases which are necessary in the block, have been built into the inner partition walls, which have thus actually had to be constructed of a light framework with plaster on wire lathing.

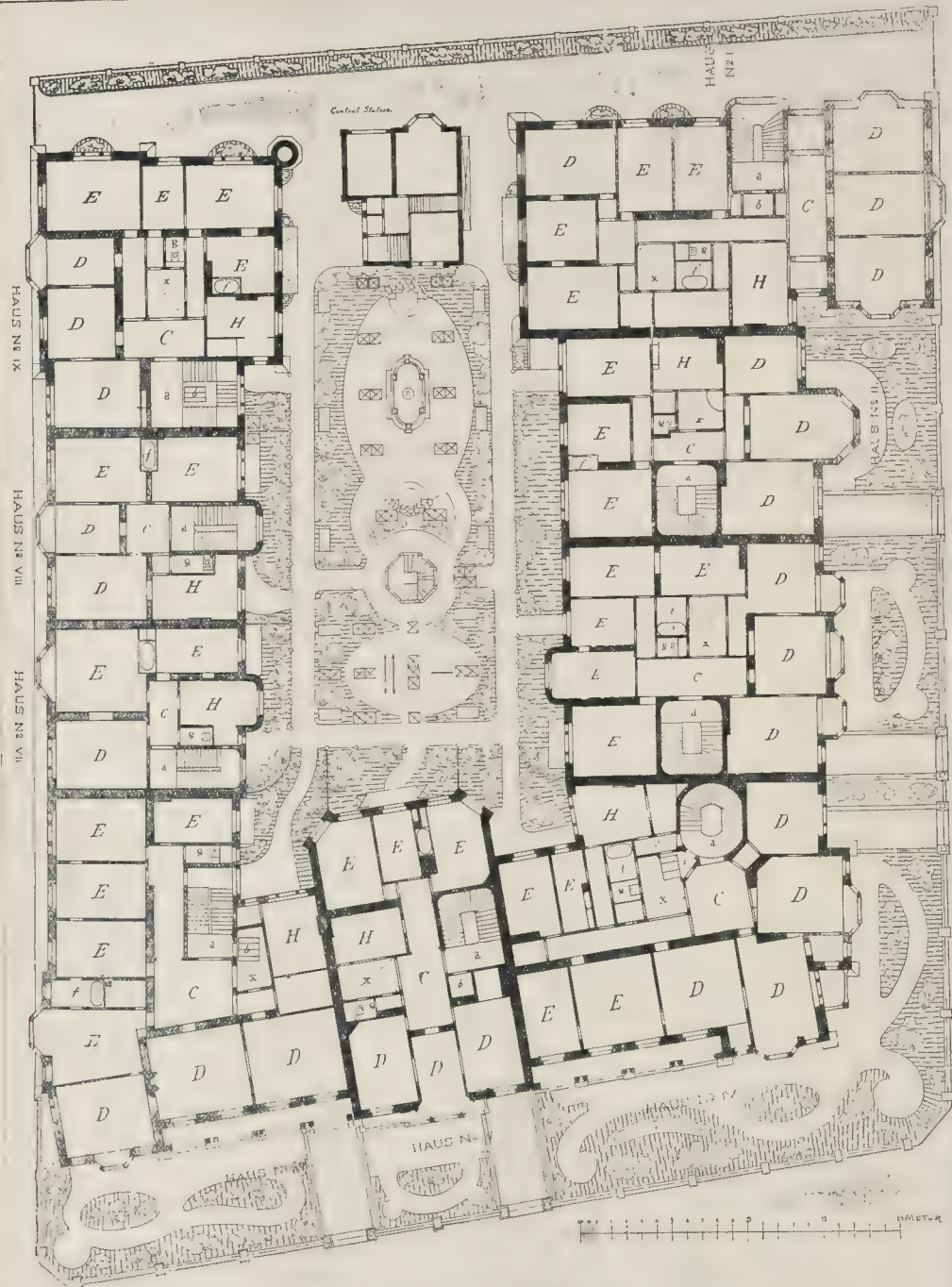
The plans of the tenements are in accordance with the requirements of the country, and are locally considered to be practical; but such arrangements as the bath-cupboards, or so-called bath-rooms, of the houses Nos. 2, 5, 6, 7, 8 and 9 would be severely condemned in this country, however ingenious and economical their contrivance may be. As regards protection against fire it would be well to remark that the divisional walls and floors between each tenement may be considered "fireproof," but the granite staircases by which they are approached show a dangerous construction. No hydrants are to be found on the premises.

The interior decoration does not call for attention, being of tawdry and coarse description. The exterior, however, is certainly deserving of note as a clever attempt to break the monotonous and barrack-like appearance which blocks containing flats mostly show.

The materials used on the façades are free-stone and cement, with red facing-bricks for the surfaces, a combination which compares favourably with the stereotyped Berlin or Vienna plaster façade.

It may be of interest to know that the best flats, on the first floor, are let at 5,000 francs, or 200*l.* per annum, and the least expensive, on the third floor, 1,350 francs, or 54*l.*

Messrs. Ernst & Co., the architects, were the actual promoters of the enterprise, and at the same time acted as their own builders. The



The R. L. C. University, Zurich.
 a. Staircases. b. Passenger Lifts. c. Lobby. d. Entrance. e. Ball Room. f. Hall. g. Lecture Hall. h. Assembly Hall. i. Theatre. j. Gymnasium. k. Library. l. Museum. m. Observatory. n. Planetarium. o. Botanical Garden. p. Zoological Garden. q. Botanical Garden. r. Zoological Garden. s. Botanical Garden. t. Zoological Garden. u. Botanical Garden. v. Zoological Garden. w. Botanical Garden. x. Zoological Garden. y. Botanical Garden. z. Zoological Garden.

responsibility of the design rests with Herr Heinrich Ernst, of Zurich. The block was practically completed on October 1 of this year.

DESIGN FOR THE PAINTED DECORATION OF THE ROOF OF A UNIVERSITY HALL.

By GERALD C. HORSLEY.

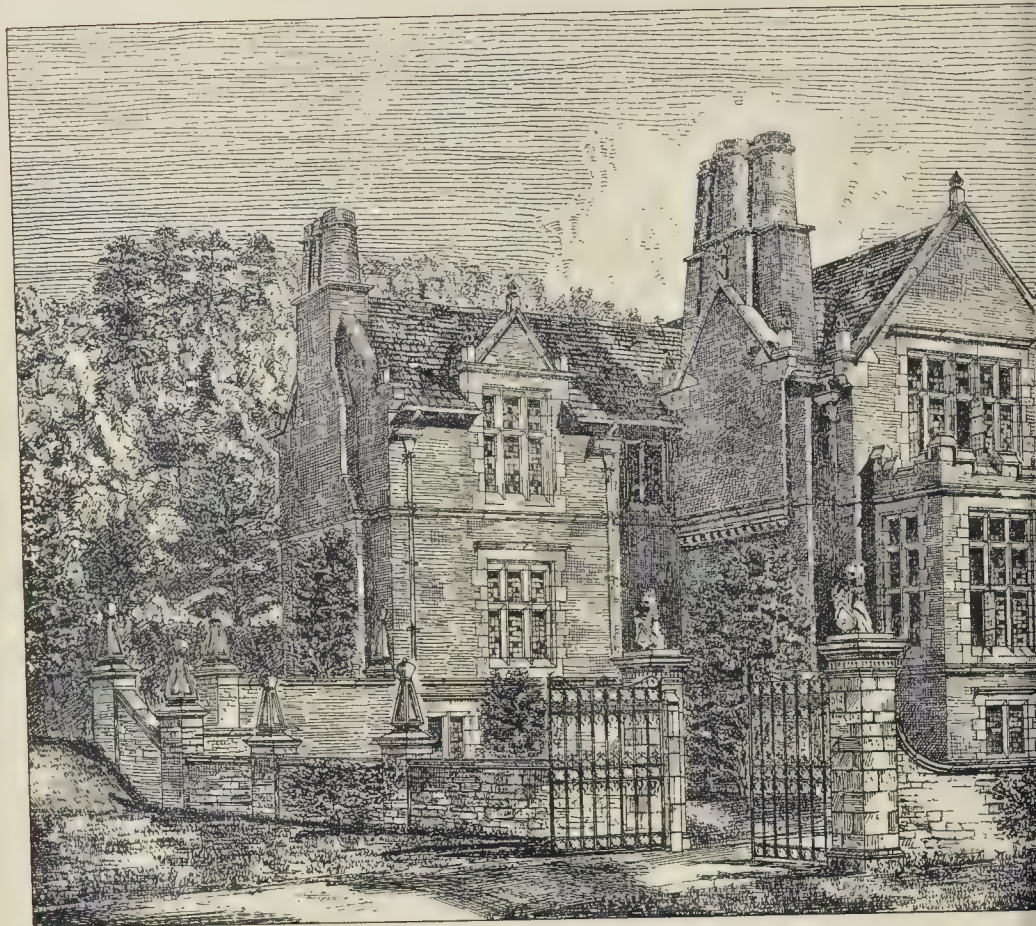
This is part of a design made for the painted

decoration of the domed ceiling of a large hall of a northern university; a building intended for meetings of convocation, and for use on occasions when degrees and other honours would be conferred. Nine figures were designed, to represent the principal arts and sciences taught in the University, Philosophy occupying the central position, and the kinship between it and the other sciences being represented by rays spreading from its head to each.

The figures stand on globes floating in a clouded sky, typifying the universal range of each science. Behind them is a wall in which are openings, showing the Promised Land attainable through knowledge, a clear blue sky surmounting the whole.

The hall is of large size, and the ceiling some 80 to 90 ft. from the floor level, and it was intended that the figures should be in scale with the building.

THE BUILDING



"BLAWITH," GRANGE-OVER-SAN

Royal Academy Exhibition, 1893.



W. F. 2. THE "PRACUE" A. 4. 4. 4. EAST HARDING STREET, BETTER LANE, E. 1.

THE BUILDER, DECEMBER 9, 1893

DESIGN FOR THE NEW
CLAREMONT GRANGE
INN, GARDENS, W.C.

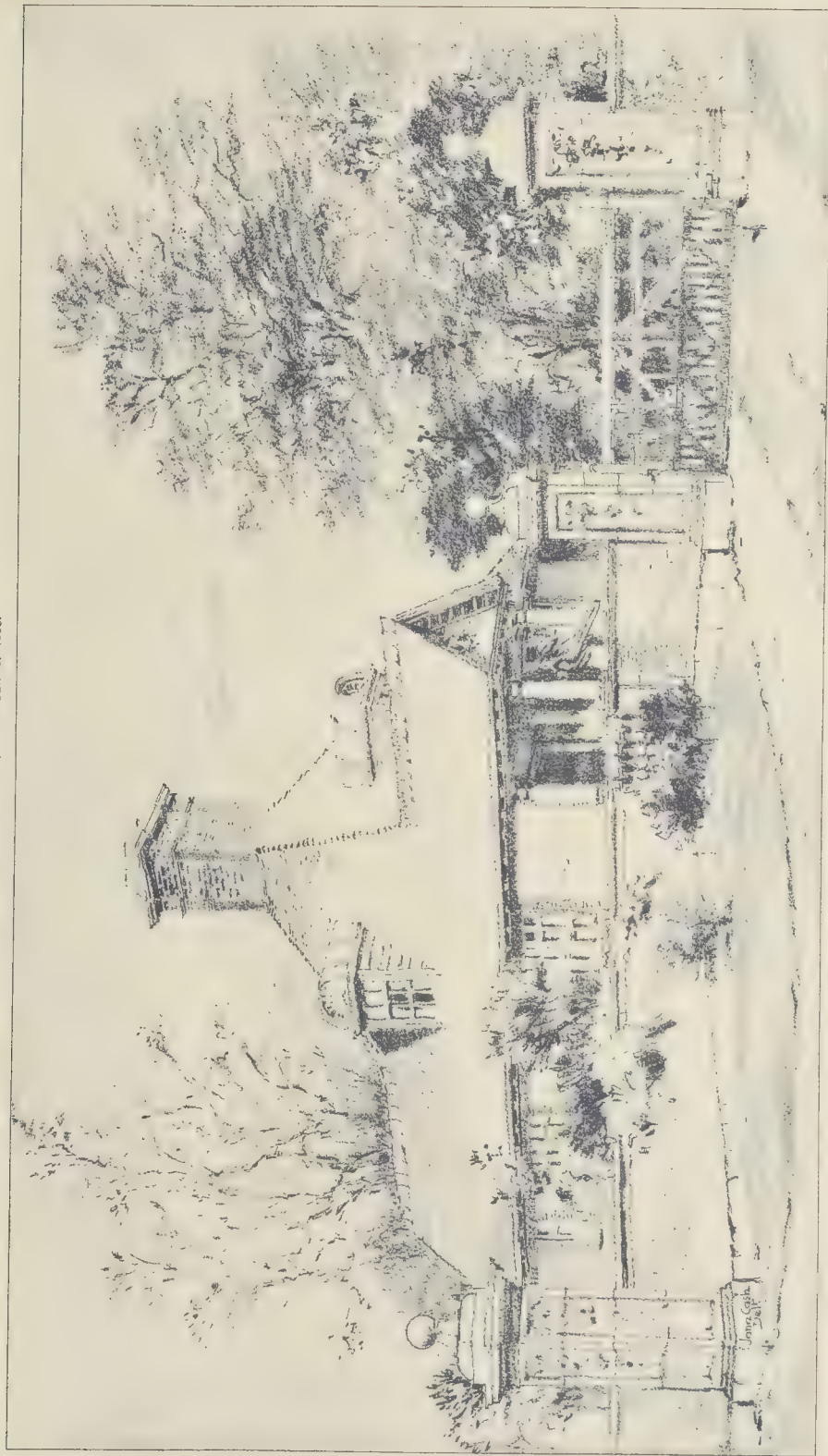


PLAN

Scale 1/4" = 10'

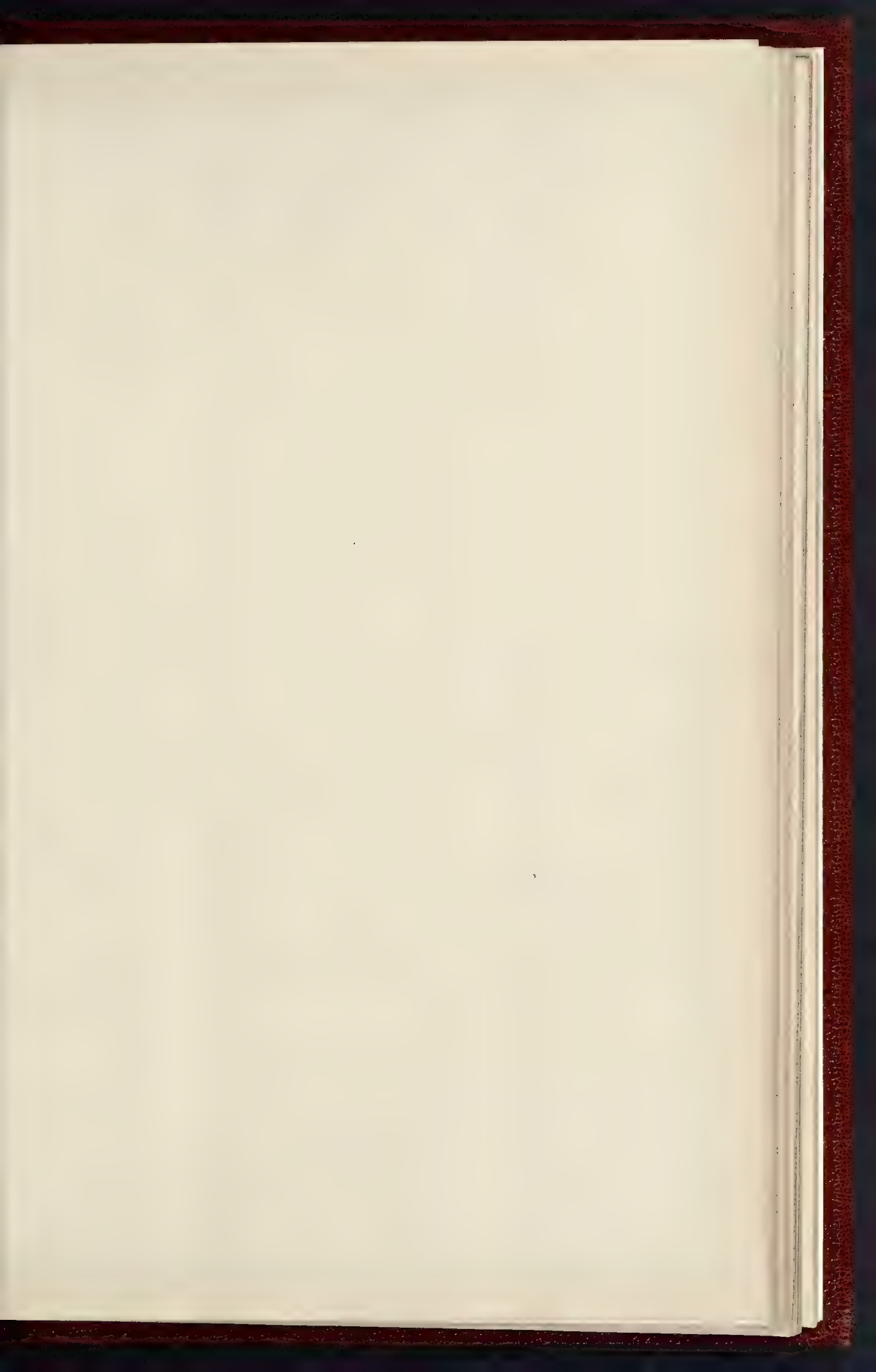


Designed by
Messrs. J. & W. G. Carter
1, Abchurch Lane, E.C. 4, London



ENTRANCE LODGE, "MONGEWELL," WALLINGFORD. MR R S WORNOM, F.R.I.B.A., ARCHITECT

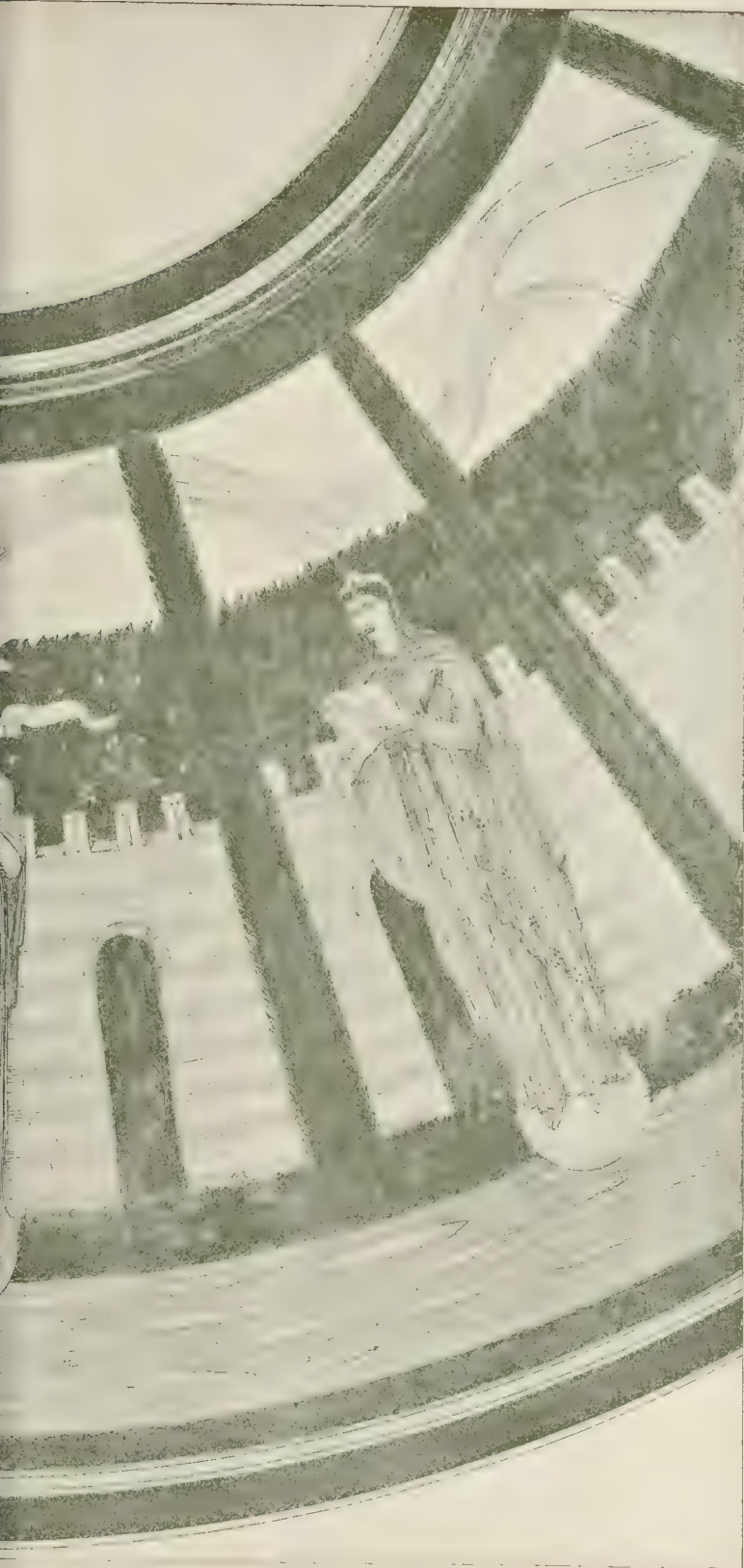
Royal Academy Exhibition, 1893.





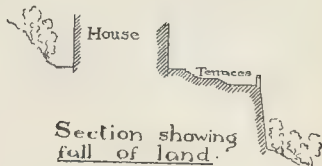
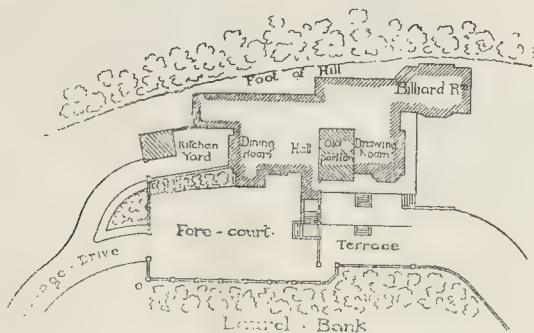
Royal Academy Exhibition, 1868

DESIGN FOR PAINTED DECORATION FOR F



UNIVERSITY HALL — BY MR. GERALD C. HORSLEY

Block Plan
Scale of 10 20 30 40 50 60 70 80 90 100 110 120 feet



Willink & Thicknesse
Architects

"Blawith," Grange-over-Sands.—Block Plan.

"BLAWITH," GRANGE-OVER-SANDS.

This house stands on a narrow platform on the side of a steep hill overlooking Morecambe Bay. This position explains the somewhat extreme length of the plan in relation to its width.

The style of the exterior is in many respects, notably the chimneys, that of the old buildings of the district, such as Levens Hall, Sizergb, &c. Following this precedent, also, all the chief rooms are elaborately panelled with oak from floor to ceiling, the staircase being a special feature.

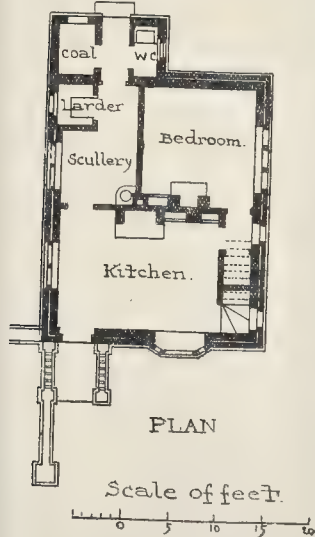
The contractor is Mr. Enoch Denny, of Grange-over-Sands, and the architects Messrs. Willink & Thicknesse, of Liverpool. The drawing was exhibited at the last Royal Academy Exhibition.

DESIGN FOR NEW CHAPEL, GRAYS INN GARDENS.

This is one of the designs which were evoked by a recent abortive or mismanaged competition, and is a pleasing design showing a quiet Classic treatment suitable to the proposed situation. It is by Mr. W. J. Tapper, and was exhibited at the last Royal Academy Exhibition.

LODGE AND GATES, "MONGEWELL," WALLINGFORD.

The lodge is built with red bricks and Portland stone, and the roof covered with Broseley tiles. A plan is appended.



Lodge, "Mongewell," Wallingford. Plan.

The architect is Mr. R. Selden Worrum, and

the builders Messrs. Kinninmont & Sons. The drawing was exhibited at the last Royal Academy Exhibition.

Books.

Egyptian Art: an Elementary Handbook for the Use of Students. By CHAS. RYAN, late Head Master of the Ventnor School of Art. London: Chapman & Hall, Limited. (Science and Art Series.)

THIS is a small book upon a very large subject. Mr. Ryan hardly treats the art of Egypt from the mere standpoint of a teacher of design, but has grouped together in a few short chapters a very readable and instructive sketch of the history of the land of Egypt, notes of its geographical extent, and of its religions and its literature. The chapters are arranged more or less in the form of popular lectures; and, indeed, the idea of imparting the information contained in the little work in this form appears to have been in its author's mind from beginning to end. Starting with brief description of the small extent of the country, the inhabited area of which, we are told, was not equal to Ireland, while the population never appears to have exceeded seven millions, which is less than that of Ireland in 1844, the progress of the country from its earliest records to later times is rapidly traced. The condition of the inhabitants, isolated from other peoples, and wholly devoted to agriculture, is illustrated on the monuments: while the development of warlike spirit among the people in later times, and their campaigns, occasioned a change of pictorial representation which contrasts in a striking manner with the earlier representations. The remarkable evidence rendered of the remote antiquity of Egyptian civilisation is very properly dwelt upon, and reference is made to the inscription of Seneferu, in Syria, probably the oldest known, to which an age of about 6,000 years may be assigned. It indicates that the Egyptians were then a people, with their system of pictorial writing defined and developed, with the arts of life in full action. The excellence of the earliest works of sculpture and painting is pointed out, but we are sorry not to see any notice of the little temple recently unearthed in front of the Pyramid of Medum, the earliest known building, where every block of masonry is admirably worked at the remote period of Seneferu. There are brief notices of some of the latest discoveries, and the celebrated "wooden man" is figured, but there is only the latest allusion to the joint group of Nefert and Ra-Hotep, one of the finest pieces of realistic sculpture that has yet been unearthed in Egypt. Nor is there reference to the important style of art found at Tell-el-Amarna, where the painted pavement, recently illustrated in our pages, shows a return to natural forms after a period of retrogression. But then, how is it possible to speak of all the wonders of the Land of Egypt in a small book of 115 pages? The work is illustrated with fifty-five engravings or figures, which rather poorly help the text, for they might have been better selected. But reproductions of the examples, familiar to many, are certainly better than none. One of the most

interesting divisions of the work is the appendix devoted to ornamental decoration. The most frequent patterns and modes of treatment are pointed out, and many emblems which constantly occur on the monuments are illustrated and briefly explained.

We have doubts as to the actual amount of benefit that may accrue from the treatment of an important subject with the amount of brevity shown by the little book before us. But we must speak in terms of warm commendation as to the way in which Mr. Ryan has performed his task, supposing as we may that the intention was to write a book of small size only. It is an admirable example of compression, and a reader perusing it as his first book on Egyptian art will learn more of the subject than from many another work of more ambitious form and of greater bulk. We hope that when a second edition is called for, it may be somewhat increased in size, and that the illustrations may be in like manner materially added to in number, so as to include more of the recent discoveries.

The value of the work as a rudimentary treatise is materially increased by references again and again to the superb Egyptian collection in the British Museum; and we can but endorse the recommendation that those who would know more of the art of the remarkable land treated of, should examine the Museum Collection Catalogue in hand.

The Legendary Lore of the Holy Wells of England, including Rivers, Lakes, Fountains, and Springs. By R. C. HOPE, F.S.A. London: Elliot Stock.

THE subject of Mr. Hope's book is interesting, and, so far as we know, untouched, but the treatment of it is inadequate and somewhat disappointing. The ample promise of its title has not been fulfilled. Far more research must be expended on the matter than it has hitherto received—research, not confined to the pages of county histories, local guide-books, and the transactions of learned societies, but pursued personally with the enthusiasm of a genuine antiquary. It is from the peasantry, more than from any other source, that the legendary lore of the country-side is to be obtained, and where Mr. Hope has thus obtained it, even though at second-hand, its value is at once manifest. In fact, what Mr. Wilson has done for Cumberland ought to be done for other counties by equally competent collectors, and the sooner the task is undertaken the larger will the results be. In the present volume (which we can only regard as the precursor of a larger work) a few counties—Cornwall, Cumberland, Derbyshire, and Salop—meet with something like adequate treatment, but we are sure that Mr. Hope must have been profoundly dissatisfied at having to limit his notes on Cambridgeshire to half-a-dozen lines, and to dismiss Wiltshire with a scrap or two from Aubrey's "Natural History." Mr. Hope is not very accurate in his knowledge of north-country topography. Houghton-le-Spring and Monkton are in the county of Durham—not in Northumberland—and Patterdale has no claim to be placed in Cumberland. Imperfect as this volume is, we welcome its publication, for it will direct attention to an interesting subject, and be the means of eliciting

much information, of which Mr. Hope will doubtless avail himself.

History of Freemasonry in the Province of Roxburgh, Peebles, and Selkirkshires from 1674 to the Present Time. By W. FRED. VERNON. London: G. Keenings. 1893.

THE connexion between Freemasonry and the building craft is remote and obscure. There are not wanting in a sceptical age those who assert that—at the present time the connexion is even less than that which exists between a City Livery Company and the trade from which it takes its name—nay, that the Grand Master himself, though the possessor of countless "presentation" trowels, never well and truly laid a stone in his life. Be that as it may, Mr. Vernon's book, which shows much careful research and labour, proves that operative masons were members of the fraternity well on in the last century. "Speculative Masonry" (as the term is), that is to say, the freemasonry of Symbolism, scarcely existed before 1700, and many years elapsed before it attained the ascendancy which it now possesses; but both in its earlier and later form the craftsmen made benevolence and good-fellowship the chief objects of their union. Mr. Vernon has reproduced the masons' marks that are to be found on the ancient work in Jedburgh, Kelso, and Melrose Abbeys. They differ according to the age of the building, except that the simpler forms are constantly recurring. Apprentices selected their marks when they were entered on the rolls of the lodge as late as 1734, but what the practice was at early dates does not appear. In fact, the records of masonry are not very ancient, and Scotland has the larger number of them. The oldest—that of the Lodge of Edinburgh—dates from 1599, so that Melrose, with minutes made in 1674, can lay claim to a respectable antiquity. Nay, some stronger term must be employed if we accept the testimony of an inscription in the lodge-room, which commemorates "John Mordo, first Grand Master of St. John's Lodge, Melrose, anno dom. 1136." There was, it seems, a John Mordo, "master of work" in Melrose Abbey in the fifteenth century, and to ante-date his existence and invest him with a title unknown till 1764, was a bold stroke even for a Borderer to make. Mr. Vernon's book will interest others besides Freemasons.

The Cube Calculator, giving at a glance the Cubical or Solid Contents of any piece of Squared Scantling from 1 in. by 1 in. to 12 in. by 12 in., and from 1 ft. to 1,000 ft. long. By JOHN WHITING. London: McCorquodale & Co., Limited.

THE intention of this book is to serve the same purpose in cubing up timber as does the ordinary ready-reckoner in extending prices. The calculations are carried to three places of decimals, and, so far as we have been able to test them, are accurate. Whether any ready-reckoner is worth buying is indeed a moot point. A ready-reckoner is not usually the readiest way of reckoning, at any rate in the case of arithmeticians of average skill. As in bookkeeping mistakes often occur in carrying forward totals from the foot of one column to the head of the next, so here they would arise in the process of transcription. Calculations made with the assistance of this work would therefore require checking just as much as any others, especially as for any item exceeding 50 ft. run two or more results must be collected from the book and added together. The philosophy of checking is that although both the checker and the squarer make mistakes, they will probably not make the same. Thus a result obtained by an entirely different method affords the best kind of check. Here it must be recognised the "Cube Calculator" will sometimes be found useful, as well as in those cases where the services of a checker are not for the moment available.

Quantity Surveyors' Tables and Diary. Revised and rewritten by a FELLOW OF THE SURVEYORS' INSTITUTION. London: Metcham & Son; 1894.

THIS is a small thin pocket diary with about fifty pages prefixed to it containing a great deal of practical information and memoranda as to measurements, properties of materials, formulae, building legislation, district surveyors' duties and powers, &c., &c. In short, a really remarkable amount of information to be compressed into so small a space. It would be more useful in a more durable cover.

Correspondence.

To the Editor of THE BUILDER.

TULLIE HOUSE, CARLISLE.

SIR,—Shortly after reading Mr. Howard Smith's letter in your issue of Saturday last, I had occasion to walk down Castle-street past Tullie House. I there saw workmen engaged in fixing a great lead spout-head. I, Sir, am convinced that I designed that spout-head—that I drew it full size—and that the head was made from a copy of that drawing; and when I look at the front, I am convinced that I designed the front, that I furnished a working drawing of it to a scale of 4 ft. to 1 in., and that, from the plinth at the bottom to the cornice at the top of the clock-tower, I furnished full-sized details for every moulding or ornament upon it, and that the work has been executed from copies of these drawings, though I am told that from these copies my name was omitted.

On returning to my office, I asked for a return of the time expended on the drawings of Tullie House, and find it recorded as 1,348 hours, exclusive of my own time, which I should be afraid to compute.

I do not want to occupy your space with the history of Tullie House. I send you, therefore, a book of cuttings from the local papers, showing its history from the commencement. You will gather from it that the scheme was inaugurated by a letter from me, that a large subscription was raised, and an influential committee formed, of which I was treasurer, and Tullie House was purchased and presented to the Corporation of Carlisle as a Home for the Arts and Sciences. That for the purposes of that Committee I made certain plans to show how the work could be done. These plans I propose to call plans A. You will also see that when the buildings were transferred to the Corporation of Carlisle, and the Committee of the Free Library formed, that I, at the request of that Committee, made further plans, which they considered and approved. These I propose to call plans B. From the same report you will also see the nature of Mr. Howard Smith's appointment "to prepare working drawings from these plans." I enclose you copy of his letter acknowledging the receipt of these plans, and particulars connected with them.

I send you a copy of the drawings sent, plans B, and a copy of the *Carlisle Journal* and of the *Carlisle Patriot* of November 10 last, giving illustrations of the buildings as carried out.

You will be able to see, by comparison of the two, whether Mr. Simpson's letter is not a correct statement of fact.

With regard to the Castle-street front, the case is still more strong, for when the first portions of the buildings were somewhat advanced, a deputation from the Building Committee called on me, and asked me to prepare a more important design for that front, and to furnish the details for it. Acting under a great sense of my responsibility to our first subscribers, and on the advice of the chief of them, I consented to do so. I am firmly convinced that so little is architects' work understood that few members of the Corporation know the work involved, not in doing the Castle-street front, which is a comparative trifle, but in threshing out the essentials of a large plan—the access, the lighting, the roofing—it looks so simple when done, and it is so easy to make a little alteration here and there.

If I regarded the matter merely on private grounds, I should be sorry that any controversy has arisen—it is a source of great pleasure to me to think that I have in any way been instrumental in gaining for the citizens of Carlisle, and especially for its artisans, so great a boon as the erection of such a building affords; but the question of the authorship of the design of the building is, I take it, one of professional importance.

The only ground stated by any members of the Corporation for placing the supervision of the work in the hands of their official is that they would save thereby from 20 to 30 per cent.

I hardly think that that is still their opinion. Mr. Howard Smith's reference to Mr. Simpson requires no comment from me—it has no bearing on the case. It is not necessary for me to say how well qualified Mr. Simpson is to judge in such a matter, and having been for several years a next-door neighbour in London and a personal friend, he has many opportunities of knowing what work I have in hand.

CHARLES J. FERGUSON.
Carlisle, December 4, 1893.

UNREASONABLE DEMANDS BY ARTISANS.

SIR,—Permit me through your columns to appeal to working house-painters for a little consideration as to whether the action of their unions in initiating or supporting such an action as was heard at the Marylebone County Court last week is not most likely to prejudice their interests.

A journeyman painter had been engaged for a West End firm of decorators on a job about three miles and a half from Worcester Station. In going to the job he and three others were taken in a conveyance provided by the firm. While engaged at the job he was allowed to work 6½ hours per week, and paid a halfpenny per hour more than the unions have recently declared to be the standard wage. He received 6s. 6d. per week lodging and allowance in addition. On leaving the job he was paid by the foreman on Friday night, 9s. 6d. railway fare, 3s. for incidental travelling expenses, and 1s. 6d. cab fare in London, together with nine hours' wages for the Saturday. The railway journey is under four hours. Further, he was informed that a conveyance would leave the job at nine o'clock on the Saturday morning to take him and others to the station, or would call for him at his lodgings, which were about a mile and a quarter from the station, or would call for him at a quarter from the station. The man refused this offer, demanding 4s. cab fare, which was not paid. The wages and expenses he actually received for the four hours' journey on Saturday amounted to 11s. 6d. over and above the railway fare. This was not deemed sufficient. The firm were summoned for 4s. cab fare from job to station, together with 2s. 3d. alleged loss of time attending at the works of the firm to demand payment.

Fortunately, the Judge decided justice was with the defendant firm.

In conclusion, what possible gain can accrue, or what amount of mischief may not be done, by such treatment of employers who pay the highest wages, and who, as the above facts show, are willing to pay fairly all round?

D. J. M.

CONDENSATION GUTTERS.

SIR,—I shall be much obliged if one of your numerous readers will give me an idea as to whether there is any practical usefulness in condensation gutters, as used so often on rafters (wood and metal), to skylights, conservatories, &c.


I have lately been informed by a well-known patent-glazing firm that the grooves are quite useless (although this very firm make metal rafters with the customary channels in them), and they will go so far as to guarantee one against drips if you use their non-grooved rafters.

They argue that the one thing to prevent drips is to use good glass, and that if the glass is defective, with irregularities on its surface, no amount of condensation channels or grooves will prevent drips.

"DRIPPIY."

MR. CRANE'S LECTURE ON ORNAMENT.

SIR,—In your notice of Mr. Walter Crane's interesting lecture on the use of ornament at the Arts and Crafts Exhibition, published in the *Builder* of

the 2nd inst., the figure  is described as the

"key pattern, which appears in many countries from early times till 1617." This is known to antiquaries in this country as the "Swastika," the

"Signum salutis," which the Buddhist Priests used to mark on the forehead of their neophytes, and is believed by some to be the earliest form of the Cross. It is found on many of the ancient monuments in Ireland, and a valuable paper on this subject, with illustrations, appeared in the *Journal of the Proceedings of the Royal Society of Antiquaries of Ireland*, No. 5, vol. 1, fifth series, first quarter, 1867, contributed by Mr. W. F. Wakeman, Hon. Fellow.

CHARLES G. GIBLIN, AN.

Dublin, December 5, 1893.

EXAMINATIONS IN BUILDING AND SANITARY CONSTRUCTION.—We understand that the entries for the above examinations, to be held under the auspices of the Carpenters' Company at their hall in London Wall on December 8 and 9, amount to twenty-eight. The list comprises candidates from several large county centres, and, in fact, this examination is now becoming well known and appreciated. The number of entries afford evidence that the high standard required by the examiners before granting the certificate is becoming well known to architects, builders, local boards, &c., &c. The architects, and the examiners appointed by the Company are as follows:—Professor A. Wynter Blyth, Professor Banister Fletcher, F.R.I.B.A., Professor Henry Robinson, M.I.C.E., Mr. H. Clifford Smith, Professor T. Roger Smith, F.R.I.B.A., Mr. Ernest Turner, F.R.I.B.A., the President of the Royal Institute of British Architects, the President of the Institute of Builders, and the President of the Clerk of Works Association. The questions and a list of the successful candidates will appear in our advertisement column on December 12.

The Student's Column.

GEOLOGY.—XXIV.

(WATER SUPPLY.—continued.)

NOW as to quantity. The quantity of water available at the surface during a given period is determined from the rainfall in the drainage, or catchment area, the geological structure of the ground, and the occurrence of strong springs. Thus, if we take the basin between the watersheds of any river, we can derive an approximate idea of the amount of water falling in the area per annum. But only a portion of this is actually available, as explained in the last article, by reason of so much soaking into the ground; whilst a very large quantity is evaporated and returned to the atmosphere. It is futile to make any general estimate of the quantity available unless a definite area be specified; but confining our attention to water which simply flows over the surface of the land to an adjoining stream, we find that the greatest discharge is obtained from clay land, or where the solid rocks are covered by an impervious superficial layer. Where hard rocks occupy a considerable area in the basin there is a great discharge also, unless large joints are prevalent in the stone.

A much greater quantity of water comes off a district containing porous rocks than would be imagined at first sight. Very few rocks are so absorbent that they are capable of at once securing the whole of a steady downpour of rain. Then, again, a great deal depends on the slope of the surface of the ground. Where this slightly undulates, the rain has abundant time and opportunity of finding any joints, or places that are capable of taking up water; but where the slope is a high one, the rain is hurried away, it may be on to entirely impervious land, and at once adds its volume to the neighbouring river.

In estimating the quantity of water absorbed by strata in a catchment basin the geologist, therefore, has to take cognizance of the respective areas of rocks that are (1) very porous; (2) partially porous, and (3) impervious; and the relation these rocks bear to each other. It frequently happens that the whole of the water from an impervious area is discharged on to a pervious one, when large quantities which would otherwise have been available at the surface, disappear. This is the case, for instance, with certain parts of the Thames. Limestones and other porous rocks alternate with thick clays along the course of that river in its higher reaches. If the river is gauged on flowing over a thick clay bed just before it enters on to a stretch of earthy limestones, and is re-gauged at the point where it is about to leave the latter, it will often be found to be diminished in volume, in spite of the fact that one or two tributaries were received between the points gauged. No question can, of course, arise as to what has become of the lost water—it has soaked into the ground.

It is perfectly possible, however, under certain circumstances, for a normally porous bed to become impervious. The rainfall in an area might be so heavy and so continuous as to completely saturate the porous bed, when it becomes, of course, non-absorbent for the time being. The same thing might happen, also, with reference to a pervious stratum in the bed of a river.

There are two circumstances which are rarely taken into account in considering the quantity of water a certain area will yield—the number of days on which rain falls therein, and the average duration of the showers and storms. We submit that these are important elements in the discussion. Given two drainage areas, with exactly similar geological and physical conditions in each, both with a rainfall of 25 in. per annum, we may get totally different relative results as to quantity of water available at the surface and underground respectively in each, which difference is brought about by the manner in which the rain falls in the two areas. In one, perhaps, the greater part falls in a month or two, whilst in the other it is fairly distributed over the year. It may descend as gentle showers, which the porous rocks eagerly drink in, or in torrents so that they do not get their full share.

The principal value of geology to the engineer in dealing with questions relating to quantity of water contained in any given area, is the capability of the science in so many instances of giving an account of what becomes of that which penetrates underground. If the geological structure of the area comprised within a catchment basin were such that no rain falling in that area could find its way out of it except by channels at the surface, the problem would be comparatively

simple. But this is rarely the case. It most frequently happens that a considerable quantity of the water escapes underground into other districts. Very few instances of this nature could arise without the knowledge of a practical geologist; his chief difficulty would be to estimate the amount of water thus lost. A glance at the section in fig. 1

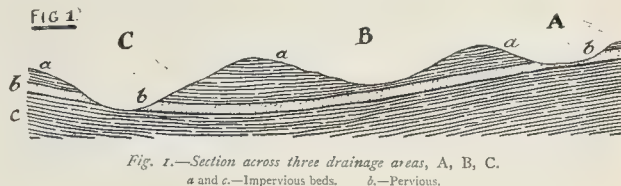


Fig. 1.—Section across three drainage areas, A, B, C.

a and c.—Impervious beds. b.—Pervious.

will be sufficient to explain the nature of this difficulty. Here we have a pervious bed (b) cropping out at the surface in the drainage area A, and absorbing a large proportion of the rain falling therein. By reason of the inclination of the pervious bed, the water thus derived rapidly flows underground out of the area, passing under B, where it is covered by an impervious bed (a), and finally crops out in the basin C. From this it will be observed that a large body of water drains into C from A, and this circumstance would be of much importance to the engineer when designing a general water-supply scheme, or to the architect if about to sink a well in a country district. The bed b forms a good water-bearing stratum under B, and a well sunk into it in that area would arrest a certain quantity of the water which would otherwise find its way out in C.

Slight faults, barely recognisable at the surface of the ground, however, might change the whole aspect of affairs, as will be gathered from fig. 2. Water from A in b will be arrested on arrival at the fault under B by that portion of a, which abuts

majority of cases, unknown quantities. In a town, from 20 to 30 gals. per head per day is generally regarded as a liberal supply, and we have seen it stated that 20 to 25 gals. per head should be sufficient for country mansions also. This quantity might possibly do where very little is used in the garden, and where no fire service is installed; in other cases we do not think 30 to 40 gals. per head, per day, an extravagant estimate.

GENERAL BUILDING NEWS.

INDUSTRIAL SCHOOL, KNOWLE, BRISTOL.—St. Agnes' Industrial School of the Sisters of Charity, Upper Knowle, was opened on the 30th ult. by the Viscountess Halifax. Designed by the late J. D. Sedding, the buildings are now, with the exception of the chapel, practically completed. We gave a short description and an illustration of the building in our issue for June 14, 1890.

CHURCH, HORRABRIDGE, DEVONSHIRE. On the 30th ult. the new church of St. John the Baptist, erected at Horrbridge, was consecrated by the

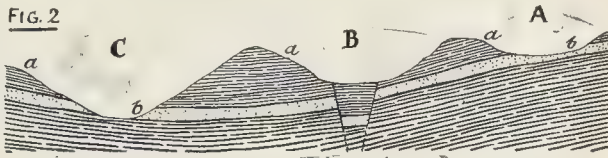


Fig. 2.—Legend same as in Fig. 1.

against it. If a spring did not issue at the surface along this line of fault, the water could be made available in drainage area B with but little engineering skill. It would form an excellent spot for sinking an artesian well. Very little water would be found issuing from b in C, as will readily be understood. From the foregoing illustrations the student will perceive the immense importance of an accurate knowledge of geological structure in well-sinking; examples of the same kind could be multiplied indefinitely.

In regard to the geological aspects of water-supply to country mansions and villages, the chief points are to examine the water-bearing capacity of any hills that may be situated in close proximity to the house, and especially to note the position and volume of springs. These latter, with but little handling, can frequently be made to yield much more than their normal capacity, and could be supplied by gravitation. Storage may be necessary to keep up a regular supply. In the absence of any such springs, or water-bearing beds at high levels, recourse must be had to underground sources. In a populated district many wells will probably have been already made, and the architect's first care will be to make enquiry concerning these. Having satisfied himself that both quality and quantity leave nothing to be desired, he has next to consider whether the actual spot whereon he proposes to have a well dug has the same geological structure and hydrological conditions as the places where the successful wells exist. If he is clear on these points, the success of his own proposed well is assured. In London and many other districts, matters of this nature can be resolved with absolute certainty. The difficulty arises when the site of the proposed well is far away from others, or where new geological conditions set in. Thanks to the excellent work of the Geological Survey, however, there are very few spots in England of which the structure is unknown.

As to the quantity of water required: probably

Bishop of Exeter. The new church stands at the junction of the main roads to Horrbridge and Walkhampton. An old chapel, dedicated to St. John the Baptist, formerly stood on the site, and in the excavations for the new church the jambs and head of a granite doorway, the mutilated cusped heads of several windows, a fragment of stained glass, and a curious old corbel and other relics of the ancient edifice have been discovered, and as far as possible they have been incorporated in the new building. The church has been built by Mr. H. B. Fuge, from the designs of Mr. G. H. Fellowes Prynne, architect, of London and Plymouth. It is cruciform in plan, with a nave, chancel, and two aisles. Gabled transepts are placed north and south, and there is a bell turret at the apex of the chancel transepts and nave. The character of the architecture is a rather free treatment of the Perpendicular period. Stone from local quarries has been used in the construction of the building, with Douling freestone for external dressings and windows, and Bath stone for internal dressings. The principal entrance is at the west end facing the Horrbridge-road, and there are other entrances to the north and south aisles. Two arches in the north and south walls of the nave open into small aisles, and the columns are octagonal in shape, with moulded capitals. In the nave and aisle the roofs are of open pine timber, but the chancel is provided with a wagon roof, divided from the nave by an ornamental oak archway, and the beam supporting a large carved oak cross. Adjoining the chancel are a vestry and organ chamber, which communicate with it through arches on either side. The east window comprises five lights. The altar has been raised seven steps from the nave level. Seating accommodation is provided for 300 persons, the seats being of oak. The altar rails, choir stalls, and vestry screen are all of oak, carved by Mr. Northcott, of Ashwater. The pulpit is of stone and wrought-iron. The font is composed mainly of Caen stone, being octagonal in plan, and placed on steps of Portland stone. From the moulded base are columns of polished Devonshire marble, supporting moulded caps. This work has been carried out from the architect's designs by Messrs. Henry Hems & Sons, of Exeter. The roof cross is in oak and has also been executed by Messrs. Hems

& Sons. In the central portion in a circular panel is the sacred monogram I.H.S.

BOYS' SCHOOL, ELSA CAR, YORKSHIRE.—On the 4th inst. new boys' schools were opened at Elsecar. Mr. William Dickie, sen., was the architect, while the various works were entrusted to—Messrs. John Hague & Son, Hoyland, masons; Mr. Bower, Wentworth, joiner; Mr. MacFarlane, Birdwell, plasterer; Mr. Cooper, Wentworth, slater; and Mr. Carr, Rawmarsh, painter, &c. The school, which has been built at a cost of 2,500*l.*, consists of four rooms, accommodating respectively 100, 60, 50, and 40 children.

RESTORATION OF PENHALL CHURCH, SALOP.—This church, which has been closed for two months whilst undergoing alterations on a large scale, was opened on the 3rd inst. Mr. R. Bateman was the architect, the building work being done by Mr. H. Nevett, Ironbridge, and the painting by Mr. G. R. Curzon, Madeley Wood.

WORKHOUSE CHAPEL, BIRKENHEAD.—The foundation stone has just been laid of the new chapel at Tranmere Workhouse. The architect of the building is Mr. James Francis Doyle, of Liverpool; the surveyor is Mr. Sidney Walter Doyle, Robey; clerk of the works, Samuel Gunning, Liverpool; contractor, John Thomas, Oxtou; foreman, Charles Corcoran. The work now to be done consists of building a new chapel on a site adjoining and to the north of the present workhouse to accommodate 300 worshippers, at a cost of about 1,680*l.*

ALTERATIONS TO PRESBYTERIAN CHURCH, CARDIFF.—Additions and alterations have been carried out at the Presbyterian Church, Cardiff, during the past six months, and the church has just been re-opened. The additional space has added 120 sittings to the church, which is now seated for over 800. The old gallery has been taken down and rebuilt at the west end. A new three-storied wing has been also added, adjoining the church hall. The work has been carried out by Mr. D. Davies, contractor, from designs prepared by Mr. E. M. Bruce Vaughan, architect. The decorations and new windows have been carried out by Mr. Bell, of Bristol. The whole cost of the buildings will exceed 3,500*l.*

VALE ST. JAMES'S CHURCH, CARDIFF.—St. James's Church, Cardiff, was externally completed on the 27th ult., when the vane which surmounts the spire—which, with the tower, is 160 ft. high—was placed on the top. The new church, which stands at the eastern end of the parish, is in the Early English style, and has been built from a design by E. M. Bruce Vaughan, architect, of Cardiff, at a cost of nearly 10,000*l.* It will afford accommodation for 800 persons. It was commenced two years ago, but was delayed owing to the long strike among the masons at Cardiff.

PROPOSED HOSPITAL, SOUTH STONEHAM, HAMPSHIRE.—A public inquiry was held at the South Stoneham Workhouse, West-end, recently, by Dr. Sweeting, Local Government Board Inspector, in respect to an application made by the Guardians to borrow 2,000*l.* for the purposes of an infectious hospital. Mr. W. H. Mitchell, architect, produced plans for administrative buildings in connexion with the hospital, to include accommodation for six nurses, porter, laundry, and disinfecting apparatus.

MISSION HALL, CHRIST CHURCH, EVERTON, LANCASHIRE.—On the 3rd inst. the Bishop of Liverpool opened the new mission-room and Sunday school in Howe-street, which has recently been erected in connexion with Christ Church, Everton. The architects of the building were Messrs. Duckworth & Metcalf, and the builders Messrs. Lawrie & Brinley.

CHURCH, LEYTONSTONE.—A new church, which has been erected at the junction of Hainault and Fairlop roads, Leytonstone, was consecrated recently by the Bishop of St. Albans. The church consists of one nave and two aisles. Local bricks were used in the construction, faced with Weldon stone. Seating accommodation is provided for 600 persons. The church is heated by Gundy's hot-air system. The architect was Mr. Richard Creed, of Little Bardfield Hall, and the contractor was Mr. S. C. Farmer, of Braintree. The total cost of the church was about 2,000*l.* A stone pulpit has been given to the new church by the architect.

CHAPEL, HESWALL CHURCH, CHESHIRE. On the 25th ult. the Bishop of Chester consecrated the new side chapel, built in connexion with Heswall Parish Church by Mr. and Mrs. Thomas Brocklebank. The chapel faces the chief entrance to the church, and is 100 ft. long and 15 ft. broad.

The body of the church was recently rebuilt, after being partially destroyed by lightning. It is a building in the Early Decorated style, the architect being Mr. J. Francis Doyle, who is also the architect of the Brocklebank Chapel. The new structure is built on the south side of the extended chancel, and is in the Perpendicular style. The walls, both inside and out, are faced with ashlar stone, and the windows will eventually be filled in with stained glass by Kemp, of London. The roof is of English oak, and the screen, which divides the chapel from the chancel, is of carved masonry. The pavement surrounding the altar is laid with mosaics, and the fittings throughout are of oak. The altar, by Norbury, Liverpool, is of the same material, the centre panel being filled by a painting of the Saviour.

SANITARY AND ENGINEERING NEWS.

WATER SUPPLY, KINGSBRIDGE (DEVON).—The District Local Board have instructed Mr. Frederick Beesley, C.E., of Westminster, to prepare a scheme for the water supply of Kingsbridge and Doolibroke.

DRAINAGE, WATER ORTON, WARWICKSHIRE.—At a meeting of the Rural Sanitary Authority for the Union of Aston, held at the Workhouse, Gravely Hill, on the 28th ult., Mr. J. Edward Wilcox, C.E., furnished a report with reference to the drainage at Water Orton. He stated that, both in construction and design, the existing sewers and drains were altogether unfitted for the conveyance of sewage. They were laid with insufficient fall to be self-cleansing, and he found them filled in many places with solid sewage matter and road detritus. In consequence of the difficulty of dealing with surface-water by the introduction of storm overflows, he strongly advised the disuse of the existing drains for sewage purposes, and that a separate system of small pipe sewers, with self-cleansing gradients, be laid down for the sewage alone, leaving the present drains and culverts for the surface-water. The cost of the works he estimated at 1,200*l.* The report was accompanied by plans and estimates setting forth all the details of the scheme. Mr. Wilcox also laid before the authority plans for providing a water supply for Water Orton by the Birmingham Corporation.

SEWERAGE WORKS, RHYL.—At the monthly meeting of the Rhyll Improvement Commissioners, on the 4th inst., the recommendation of the Sanitary Authority that Mr. Baldwin Latham's plans and estimates for the proposed new sewerage works be approved of was adopted; and the Clerk was instructed to apply for the sanction of the Local Government Board to a loan of 18,435*l.* for carrying out the works.

WATER SUPPLY, ACKWORTH, YORKSHIRE.—The Hemsworth Rural Sanitary Authority having successfully negotiated with the Pontefract Corporation for a supply of water to Ackworth from their works at Roall, Colonel Ord Hasted, R.E., held an inquiry recently, at the Public Rooms, as to application by the Sanitary Authority for a loan of 4,400*l.* for the necessary work. Mr. G. Hodson, C.E., is the engineer to the scheme.

SEWERAGE SCHEME, MIDDLETON, LANCSHIRE.—Major-General H. D. Crozier and Mr. Edmund Pearse Burd held an inquiry at the Town Hall, Middleton, a few days ago, relative to an application by the Middleton Corporation for powers to borrow 55,000*l.* to acquire land and erect sewerage works thereon. Evidence was given by Mr. F. Entwistle (Town Clerk), Mr. Hinnel (who prepared the scheme), and Mr. W. Wilburn (Borough Surveyor). Dr. Parkhurst, on behalf of the Manchester Corporation, stated the objections they had to the scheme. At the conclusion of the inquiry the inspectors made an inspection of the site and its surroundings.

SEWERAGE SCHEMES, WAKEFIELD DISTRICT.—On the 4th inst. Colonel Ord Hasted, R.E., held an inquiry at Tetley House, Wakefield, with reference to an application by the Rural Sanitary Authority of the Wakefield Union, for sanction to borrow 11,000*l.* for the cost of proposed sewerage and sewage disposal works for the townships of Alverthorpe, Stanley, and East Ardsley. The scheme, devised by Mr. T. Massie, the Engineer to the Authority, deals with certain parts of the three townships which cannot be taken into the existing drainage works.

PROPOSED RECONSTRUCTION OF THE NORTH BRIDGE, EDINBURGH.—On the 29th ult., at the meeting of the Lord Provost's Committee of the Edinburgh Town Council, the question of the reconstruction of the North Bridge came up for consideration. It was mentioned in the course of the discussion that Sir William Arrol, who is acting as Consulting Engineer to the Corporation, is at present considering among other matters the advisableness of widening the bridge by "eking." From the point of view of cheapness, the process of "eking" the bridge, it is said, would have much to commend it, for the present bridge and piers would remain, but there might be other reasons which would have weight with the committee in considering the matter. A plan has been prepared by the Danah Engineer showing how North Bridge street might be widened to 75 or 80 ft. by taking down and rebuilding the west side at a cost of 70,000*l.*

FOREIGN AND COLONIAL.

FRANCE.—The Municipal Council of Paris having been very well satisfied with the result of the provisional covering in the Cour Louis XIV. at the Hôtel de Ville, on the occasion of the Russian fêtes, has commissioned M. Bouvard to make a study for a permanent roof of glass and iron over the court, and for a monumental staircase similar to the one erected by Baltard in the corresponding court of the old Hôtel de Ville. A new bridge, some, intended to replace that of the Avenue de l'Alma, is to be constructed, it appears, in the neighbourhood of the Parc des Buttes-Chaumont, from the plans and under the direction of M. Labro. An interesting exhibition of stone-ware has been organised in the Georges Petit Gallery by M. Daprevant and Môme.

Lesbros.—A series of drawings by old German masters—Albert Dürer, Cranach, Hans Baldung, and others—is being exhibited at the Louvre, in a room adjoining the Pastel Gallery. In the Cour de Dépôt of the Palais de Justice at Paris, where some new building work is going on, foundations have been discovered of buildings dating as far back as the time of Philippe Auguste, along with coins stamped with the effigy of that king. At Vitry on the Seine works will shortly be proceeded with which will involve the demolition of a whole quarter of that little township, in order to complete the "route stratégique" of 18 kilometres, which will unite the forts of Vincennes with the forts of Palaiseau and Verrières. The entrenched camp of Paris will then be completely united on two of its faces, with the works of defence. M. Bourmann, an architect who was sent out to Constantinople to construct a French hospital there, has died there from an attack of cholera. The new cathedral of Marseilles was solemnly inaugurated last week. In 1887 we published a view of this fine monument, the first stone of which was laid by Napoleon III. in 1852. It was designed by Léon Vaudoyer, who was succeeded on his death by M. Esplanade, architect, of Revolt. It is the most important religious edifice raised in France in the present century. It is stated that an authentic painting of Paul Veronese has been discovered at Tunis, and is to be sent to Paris. The Municipality of Périgueux are about to open a competition for the design for a Museum. At Algiers the "Service des Monuments Historiques de l'Algérie" has discovered at Timagad some Roman baths with a well-preserved mosaic pavement. The "Société Centrale des Architectes Français" met on Sunday the 3rd for the election of officers and committee; the following were chosen:—President, M. Daumet; Vice-presidents, MM. Guadet and Corroyer; Principal Secretary, M. Roux; Assistant Secretary, M. Reil; Editor, M. Reil; Treasurer, M. Perrin; Archiviste, M. Bartaumeux; Treasurer, M. David de Penanrun.

GERMANY.—Arrangements are already being made for next year's "International" Art Exhibition at Berlin, though the undertaking does not promise well, as there are to be similar exhibitions at Vienna, Antwerp, Munich, and Milan, where the Berlin artists generally prefer to be well represented. The designs for the proposed Provincial Museum at Berlin are an excellent example of what competition estimates mean abroad. According to the competition design, this building was to cost 50,000*l.* The first proper estimate obtained shows a figure nearly 95,000*l.* This reminds us of a theatre at Halle:—According to the competition drawings it was to cost 22,500*l.* The actual cost was 60,000*l.* This is worse than England. A limited competition has been opened for some swimming-baths at Berlin. One premium only will be given of 500*l.* Stuttgart is to have a memorial monument to the late Emperor William. Eight sculptors have been invited to send in designs. The premiums have a value of 150*l.*, 100*l.*, and 50*l.* respectively. There has already been an unsuccessful open competition, in which Herr Klein took the first premium. The old University Buildings at Leipzig are to undergo a thorough renovation. The Saxon budget includes votes for this purpose, which show a proposed expenditure of over 65,000*l.*—The old city of Rostock is to have a new municipal theatre, with some 900 seats. Herr Seeling, the architect of the Halle theatre, Herr M. Semper, the son of the late Gottfried Semper, and Messrs. Schüter and Becker, of Berlin, have been invited to compete for the design. Each competitor receives a fixed fee of 75*l.* The valuable collection of Egyptian bronzes belonging to Mr. Rudolf Springer has been recently exhibited at the Egyptian Museum in Berlin. They are for the most part taken from the temple of Saïs; and are nearly all figures of the Gods worshipped there. Three of the figures measure 2 ft. in height. On most of the pedestals are votive inscriptions. One of these, according to the *National Zeitung*, is most interesting, as it is shown in hitherto unknown hieroglyphs. The writing is supposed to be that of the Gyrane people, who in 663 B.C. assisted to establish Psammethichus I. on the throne. The figure on the pedestal in question is considered to date from his reign.

BELGIUM.—The arrangements for electric lighting in the Hôtel de Ville at Brussels are now practically complete. The Brussels Municipality has commissioned M. Mellery to paint a large allegorical picture, "Communal Power." M. A. J. Wanters is asked to publish in illustrated work on Moming and his pictures. Mr. G. R. de Courcy-Perry, the British Consul General, will represent English interests at the Antwerp International Exhibition. He will act in his private capacity as the agent of the British exhibitors. Our Government will not be officially represented. Though the electric lighting of Brussels is plying in charge of the electric lighting of Brussels is already making rapid progress in fulfilling private demands, there is little likelihood of the modern illuminant being introduced by the Municipality for street purposes. The gasworks are in the hands of the Municipality, and the price of gas has always been so fixed that the profits made by supplying the private wants of the inhabitants cover the expense of lighting the public thoroughfares.

RUSSIA.—The so-called international competition for the design of children's hospital for Riga has

been decided. Only five designs had been sent, and none of the proposals were considered deserving of the first premium. The value of the premiums has been distributed equally between Messrs. Felsko (Odessa), Dessien (Moscow), and Messrs. Felsko and Neuburger (Riga). Non-Russians are seldom tempted to send work into the dominions of the Czar.

MISCELLANEOUS.

A NEW SPECIALITY: JUGGLING WITH DRAINS.—At the last meeting of the Harrow Local Board a nice bit of trickery was disclosed on the part of a mason who had been engaged to put in the drains to some new houses. When the Surveyor went to apply the water test he found that, instead of the whole drain being filled with water, only the last pipe was so charged, a slate having been ingeniously placed across the bottom of it so as to prevent the test water ever getting into the drain at all. The water stood and maintained its level, and a less careful Inspector might have gone away satisfied that the drains were perfect. Fortunately, he ordered the plug at the sewer end to be removed and waited to see the water flow away, which, however, it declined to do, and then the whole trickery was laid bare. A clever builder, who had been told to the Board, stating that they "immediately discharged the bricklayer." The Chairman very rightly remarked that "a bricklayer would not take upon himself to deceive our Inspector on his own account." But it was afterwards explained that the man they had employed was a London specialist who had done work for years, from which it would appear that laying drains is a special job, having a special line of scamping of its own; and we may fairly opine that this is not the first time, nor Harrow the first place, where this little trick has been performed. Clearly, an Inspector must know of underground drains, but possess a deep knowledge of human nature, particularly as developed in the building trade. In the meantime we must accept with thankfulness the very simple lesson that, if the water test is to be of any service, the process must be watched from the beginning to the very end.—*British Medical Journal.*

THE WILMOUTH SLATE TRADE.—A short time since the ss. *Dinorwic* made a record by discharging in the Pool 300 tons of Bannor roofing slates, consigned to Messrs. Bingley, Son, & Follit, from Mr. Assheton-Smith's Dinorwic quarries. The importance of this innovation may be gauged when it is known that water-borne slates had previously been conveyed by sailing vessels only, that occasionally such voyages had extended to over two months, but that under the new system three days suffice for the journeys to be completed. On the 21st inst., the ss. *Vaynol*, specially built for the purpose by the Dinorwic Steamship Company, arrived at Messrs. Bingley's wharf, adjoining Vauxhall Bridge, with 200 tons of slates from the same quarries, this being the first steamer to pass the London bridges with such a freight.

SCIENCE AND ART DEPARTMENT.—The list of students who passed in the Honours Stage of the various subjects at the Science and Art Department Examinations last May has just been issued. The only London man who takes first-class honours in Building Construction is H. J. Palmer, a student under Professor Henry Adams at the City of London College. Mr. Palmer is therefore the winner of the £5. prize offered to the student of the college who takes the highest place in this examination, and only missed the 10l. prize for the first place by a very narrow margin.

DISCOVERY OF AN OLD CHURCH AT HERTFORD.—The Church of St. John the Evangelist, the parish church of St. John's parish, had entirely disappeared from the eye of the public for very many years. In October, the Corporation having called upon one of the owners of the old site to lay on water and do other work to some cottages, the ground was opened for that purpose, and disclosed two thick clay walls, separated by a certain interval. The adjoining owners (Messrs. Andrews) then took up the search, and by means of extensive excavations they gradually found the western angle and the eastern angle of the south transept, then the north wall of the nave, thus establishing its width inside at 40 ft.; then its north-west angle, which they found to be very much broken down, because originally the ground at the west end was a very steep slope. By this it appeared that the length of the nave inside from its junction with the transept was 87 ft., or exactly three times its width, and that the walls were uniformly 4 ft. in thickness; and as all this occurred upon Messrs. Andrews' own premises, none but they could have been inconvenienced, but they felt that the north transept and a chancel should also be sought for. They therefore approached their neighbour to obtain his leave, which he at once accorded, to enable them to do whatever they thought necessary in searching for the ruins. They then soon found the angle of the nave and north transept, and expecting the north transept to be of the same dimensions inside as that on the south side—viz., 30 ft. long and 20 ft. wide inside—made a series of excavations, and established that fact, but found the walls on the north and east sides so far gone that only the materials (viz., flints and a light-coloured brownish mortar) were left to show where the walls originally were. After this the pier at the angle of

the chancel and north transept was recovered, with three tiers of clunch stones *in situ* and in a good state of preservation. This not only established the fact of a north transept, but showed the width of the chancel to have been 24 ft. 8 in. inside. In addition to this a small fragment of the south wall of the chancel was found, which also proved its width. In the prosecution of the excavations were found many pieces of highly-glazed ornamental paving-tiles, from which the several patterns have been built up, and appear to be of the early part of the thirteenth century. The tiles were of red ware and had their edges much bevelled or undercut.

DESTRUCTION OF BEARPARK RUINS, DURHAM.—For many years past all that has remained of Bearpark was the south gable of what was probably the dining hall or refectory, standing out amidst grassy heaps of ruin. This, says the *Newcastle Chronicle*, has succumbed owing to the recent storms, and there is little or nothing left now of what was once a summer palace of the priors of Durham. Bearpark became the property of the convent in the early part of the thirteenth century, and, as its name seems to signify, it was then the haunt of animals of the chase. When, in 1258, Bertram de Middleton resigned the priorate, Bertram and other places were granted to him for his maintenance, and we are told that he, probably after his retirement, "erected a residence (camera) as well as a chapel, which, in the opinion of many persons, were inferior to few structures in the bishopric. The earliest domestic buildings of Bearpark were probably destroyed by the Scots during their invasion in 1315. It does not appear what a state of ruin the house was in when Edward III. passed a night there on his return from Scotland in 1327. In 1346 Bearpark became the scene of another and more memorable occupation by the Scots. During the night preceding the battle of Neville's Cross, the Scotch forces encamped within the park, and seem on this occasion to have committed much damage, and the restoration of the works carried out by Prior Fossour (who reigned from 1342 to 1374), the repair of the whole manor house of Beaupaire, "after the retreat of the Scots" is mentioned. In the account rolls of the Bursar of the Church of Durham in 1531, there are payments to the carpenter for work on the hall, and for works to the prior in the park, and the lodge within the park, at the byre, and the buttery and kitchen. The buildings were evidently extensive, and Bearpark probably resembled an abbey in miniature, with its hall and chapel and domestic buildings standing within the flanking walls. But its glory departed at the Dissolution, and although it was thereafter occasionally inhabited by the early deans of Durham, the buildings were gradually suffered to decay, and their ruin was completed by the Scots in 1640 and 1644.

THE TREATMENT OF TOWN REFUSE.—A paper on "The Treatment and Utilisation of Town Refuse" was read by Messrs. C. Rawson and C. Smithson at a meeting of the Yorkshire Section of the Society of Chemical Industry, in the Yorkshire College, Leeds, on the 4th inst. The town refuse referred to was the solid matter forming the contents of ashpits and middens. In Leeds the cost of disposal by means of destructors is 1s. 2d. per ton, in Bradford 1s. 7d., and in Newcastle 1s. 4d. Three principal factors in the disposal of refuse required consideration:—(1) no nuisance should be created; (2) the refuse should be a fuel should be separated, and used to the best advantage for the production of steam; (3) the finer portion should be separated in such a manner that it could be applied to the land as a fertiliser. An apparatus, the invention of Mr. S. Smithson, of Heckmondwike, fulfilled, it was said, these conditions. The crude refuse was brought up an inclined plane in carts, tipped into a large hopper, from which it passed into a large revolving cage, which separated all the heavy and bulky material. The other portion passes into a hopper fixed to one end of a large revolving cylinder, into which it is pressed by means of a piston. This cylinder is connected with the boiler furnace flues, the hot gases from which drive off the water, and thoroughly dry the material. This dried material is divided into two portions: the fine portion descends into a shoot, from which it can be carted and used as manure; the coarse portion passes down another shoot, and is ready for burning in the boiler furnaces. Experiment, it was stated, proved that by this method of treatment, as compared with the average destructors, the crude refuse gives six times the yield in power.

GLASGOW SCHOOL OF ART.—The third lecture of a series by Mr. William J. Anderson, A.R.I.B.A., on the "Architecture of the Italian Renaissance," was delivered on Wednesday night in the Corporation Galleries. The division treated of was the fifteenth century in Florence. The lecturer attempted to defend the earlier Renaissance from the imputation of being wholly an imitative style, pointing out that emulation rather than imitation was its ruling principle, and that it was a true reflection of the temper of the times. In sculpture it makes its first appearance in a close insight into nature, as in the works of Jacopo della Quercia and Ghiberti, illustrations of whose work were given, while, chiefly through the influence of Brunelleschi, Donatello was the first who attained fine sculptural qualities, and rivalled the antique. The lecturer

alluded to the Goldsmith-sculptor shops of the time from which so many of the architects were drawn, believing that in their training there was part of the explanation of their great versatility. Then, as now, the technical part of their education was derived from a study of the best models in Rome, and as the palaces attest, of the ancient Etrurian buildings. The rest of the lecture was devoted to an analysis of the Early Florentine style, with upwards of forty illustrative examples by lantern.

CARRIAGE-WAY PAVEMENTS FOR LARGE CITIES.—At the meeting of the Society of Arts, to be held at their rooms in the Adelphi on the 13th inst., a paper on "Carriage-way Pavements for Large Cities" will be read by Mr. Lewis H. Isaacs, Surveyor to the Board of Works for the Holborn District, in which the advantages and disadvantages of the different systems of road-paving now in use will be described.

THE SANITARY INSTITUTE.—At an examination for local surveyors, held in London on 29th and 30th ult., ten candidates presented themselves. Questions were set to be answered in writing on the 29th, and the candidates were examined *vis-a-vis* on the 30th. The following eight candidates were certified, as regards their sanitary knowledge, competent to discharge the duties of local surveyor:—Henry C. Adams, 60, Queen Victoria-street, E.C.; Charles F. Ball, 51, Prince-street, Bristol; William Henry Hill, jun., Audley House, Cork; William Henry Killick, Borough Surveyor's Office, Southampton; Lennie Henry Lee, Supervisor, Public Works Department, Calcutta, India; Thomas L. Perkins, 1, West Shrubbery, Redland, Bristol; William B. Seward, 120, Camberwell-road, S.E.; Edward Willis, 124, High-street, Eton.

BUSINESS CHANGES.—The business of architects, surveyors, and land agents carried on by Messrs. Chadwick, at No. 17, Parliament-street, S.W., will, in consequence of the death of Mr. Spencer Chadwick, be conducted in future by Mr. P. E. Pilditch, F.S.I., who has been associated with the firm for the last eleven years, under the style of Spencer Chadwick & Pilditch.—Mr. Pilditch has been appointed to succeed Mr. Chadwick as Surveyor to the London Estates of the Marquess of Salisbury, K.G., and to the other estates hitherto managed by the firm.—We are informed that Mr. Philip D. Tuckett, auctioneer and surveyor, of No. 2, Basinghall-street, E.C., has taken into partnership his son, Percival Fox Tuckett, and that their practice will in future be carried on under the style of Tuckett & Son.

LEGAL.

TRAVIS v. UTLEY.

THE case of Travis v. Utley came before a Divisional Court of Queen's Bench, consisting of Mr. Justice Wills, on Monday last, the 4th inst., for judgment.

The case came on as an appeal by way of special case, stated by the Justices of Halifax, for the purpose of obtaining the opinion of the Court on a question of law. The facts of the case were as follows:—At the Petty Sessions, held on August 18 last, an information and complaint was preferred by David Travis, the Sanitary Inspector of Halifax, against Samuel Utley, under the Public Health Act, 1875, charging him with having the drains in and upon certain premises, Nos. 105 and 107, Fern-street, Northowram, in such a condition as to be a nuisance, on August 7 last. The Justices dismissed the summons.

From the facts of the case it appeared that the respondent was the owner of three cottages, Nos. 105, 107, and 109, Fern-street, and he deposited plans with the Halifax Corporation showing that the drain ran through the centre of the three cottages for the purpose of carrying off the sewage, which by this drain was conducted into the public sewer in the adjoining street. In the cellar of each of the three cottages there was a slop-stone and a water-closet, the slop-water and refuse from which were conveyed in the pipe into the drain, running through the basement of the houses, and then discharged into the sewer. It was proved that the nuisance which existed in the cellars of Nos. 105 and 107 was caused by reason of the basement drain in No. 105 being defective. The cellar-floor of No. 105 had been opened, and the drain was found to be in a defective condition, one of the pipes which should have joined the main drain being practically open end, and the obstruction was caused by the connexion not being good.

On behalf of the respondent it was proved that he had paid the Halifax Corporation the sums demanded for flagging, paving, and channelling Fern-street, and it was contended on his behalf that the basement drain complained of was vested in the Local Authority, and that it was their duty to repair the drain and remove the nuisance. The question for the Court was whether the drain was "a sewer" within the meaning of Section 4 of the Public Health Act, 1875.

The appeal was dismissed with costs. Mr. Forbes, Q.C., and Mr. Macmormann appeared as counsel for the appellant, and Mr. Tindal Atkinson, Q.C., and Mr. R. C. Glen for the respondent.

1. The first of these is the fact that the system is not a simple one, and that the results are not always the same. The second is that the system is not a simple one, and that the results are not always the same.

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 Jas. Bruce ... £295 Chas. Burton & Son, Stoke Newington accepted. £295

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VOL. LXV. NO. 5654.

DECEMBER 16, 1903.

ILLUSTRATIONS.

New Church, Huxton: Interior.—Mr. W. D. Caröe, F.R.I.B.A., Architect	Double-Page Photo-Litho.
House, Witley, Surrey.—Mr. Basil Champneys, Architect	Single-Page Ink-Photo.
Proposed Business Premises, Exeter.—Mr. S. K. Greenslade, A.R.I.B.A., Architect	Single-Page Ink-Photo.
Design for a Frieze.—By Mr. Paton Wilson	Single-Page Ink-Photo.
Design for Wrought-Iron Grille, St. Paul's Cathedral.—Mr. A. H. Skipworth, Architect	Single-Page Ink-Photo.
Entrance Gates and Lodge, Eaton Hall.—Mr. R. W. Edis, F.R.I.B.A., Architect	Double-Page Photo-Litho.

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The Causes of Bad Work.



HE opening chapter of one of the most remarkable of modern English novels contains an incident and a brief conversation which goes to the root of the subject which was discussed at the

Architectural Association last week. Adam Bede, at work on a door in the carpenter's shop at which he was engaged, has his attention attracted by the sudden cessation of the sound of work all round him, and looking up for the reason, finds that the hour for leaving off work having struck, every man had thrown down his tool as if it burnt his hand; one man having flung away his hammer in the very act of lifting it. "Ah!" exclaims Adam contemptuously, "I can't abide to see men throw away their tools i' that way, the minute the clock begins to strike, as if they took no pleasure i' their work." The habit of mind in regard to one's work which roused Adam Bede's disgust is, we believe, at the bottom of three-fourths at least of that deterioration of workmanship which Mr. Owen Fleming commented on and deplored in the able and evidently sincere paper which formed the basis of the discussion at the Association meeting. The discontinuance to a great extent of the apprentice system, whereby a youth had the opportunity and encouragement to become thoroughly conversant with the practical details of his trade, and was compelled to stick at it as a learner for an extent of time which gave him full opportunity for learning, is no doubt answerable to some extent for the decrease in the number of really competent hands in many trades. But we believe that what is at the bottom of that deterioration of workmanship which seems to be uncontested and incontestable, is the fact that under the influence of the new trades-unionism men are encouraged to regard it as the main object not to do their work as well as possible, but to get paid as much as possible for it. Professor Garnett, the first speaker in the discussion, evidently recognised this element as the most important one in the case, and, though specially concerned himself with technical education,

went straight behind that to the moral question, how we are to educate boys to take a pride in their work and to think it a disgrace to do it badly. We may educate the boy to this, but it is difficult to see how a man is to have much chance of keeping it up afterwards, when he is taught by a trade-union to regard the obtaining a standard rate of wage as the main object of life; when he can be admitted to the trade-union without showing any proof of competency in his craft; when he is taught to regard a member of a union as a "respectable" workman, and one who is not a member, even though he is a better workman, as not respectable; * when he may work alongside a drunkard who is a unionist without derogation, but must regard a good workman who is a non-unionist as a discreditable companion; and when, if he is an exceptionally clever and industrious man, he will find that he is expected to curb his industry and his ability down to the average level of those around, and that he will be, to say the least, looked upon with distrust and suspicion if he does not. There is no subject on which trade-union leaders or officials are more touchy than in regard to this accusation; but with other evidence than theirs before us, we can only conclude that their resentment against it arises from an uneasy consciousness that it is too true. Alderman Taylor, we observe, indignantly disclaims any knowledge of any regulations tending to such a levelling down of workmanship, and asserts that "nothing of the kind had ever emanated from any of the trade-unions." Of course not; it would be the worst possible policy to give such a handle to adverse criticism as would be furnished by the existence of a definite order or instruction against working too fast or too well. But evidence that such an influence is exercised, indirectly and under the rose, by modern trade-unionism, reaches us not infrequently from one quarter or another; and it is one of those abuses of which it may be said that everybody knows of it though everybody interested in denying it denies it. Let us look at some of the evidence given by large employers of labour before the Labour Commission, and see what they think about it. Mr. Bird says in his evidence: "The action of trade-unionism is to fix not only the minimum but also the maximum of wage-

earning, and the maximum of hours that a man may work. Therefore if a man is ever so industrious and ever so expert the trade-union would not allow him to exert his abilities and earn a penny more than his less industrious fellows." Mr. Bridgman, another witness, referring to the same subject, gave evidence as follows:—

"I say that the unionists do prevent the masters giving the man who is a superior workman more money for his superiority, for this reason, that they object to the man being a superior workman and doing more work than his neighbour; they contend that if he is a superior workman and so does more work in the day, he to a certain extent is depriving that other workman of the extra amount of work which he does, therefore you cannot pay the superior workman for his superiority, that is, you cannot pay him for the extra quantity of work which he does, and therefore you level them all down to one level. Of course they fix the standard of wage."

We may next direct attention to the following extracts from Mr. Bird's evidence:—

"Men do a great deal less work now than they ever did. Where it used to be the custom for a good bricklayer to lay a thousand bricks a day, 300 or 400 is about the usual thing now; the cost of labour has increased from 40s. a rod, which it was thirty-five years ago, to 80s. or 90s. now.

32,197. Do you mean to say that that is due to the increase of wages per hour, or to the diminished work done by the workmen, or both?—Both.

32,198. You mean to say that a workman does not do as much in an hour now as he formerly did?—I say he does not do half. He does less than half now.

32,199. Do you mean to say, when you contract with a man to serve you, we will say at a given wage per hour, 8d. or 9d. an hour, he does not give you his best energies during that hour?—I say so distinctly, and I shall be borne out, I should think, by every builder in London.

32,200. You mean to say, instead of doing a regular fair hour's work, he does as little as he can? Yes.

32,201. That is rather a serious allegation?—Yes, very serious, and I make it with full knowledge of what I am saying."

The questions were put by Mr. Mundella, who did the greater part of the examination of witnesses in this portion of the evidence, and who appears to us to have examined with a very obvious advocate's bias on the side of the workman. Evidence to the same effect is given in regard to the joinery, only that here comparison is between work done before the days of machinery and work

* See evidence before the Royal Commission on Labour.

done with the aid of the modern joinery machines:—

"Now, with regard to joinery, we use machinery, and give the use of machinery, and we pay just as much for making a four-panel door as we did twenty-five years ago.

32,209.—Then, the joinery is the same, is it?—The joinery is the same, but we give the joiners the use of machinery, and I say that the labour costs just as much now as it did then, when the men had to cut the stuff out of the deal, strap it up, and square it up, and work it.

32,210.—That is a general statement?—It is; and to our cost we know it."

It appears to be a favourite method, when it is desired to get rid of or to create a prejudice against a foreman who is too energetic, to raise a cry that he scamps the work, and this kind of charge is unblushingly got up, it would appear, by men who are themselves, on principle (if one may use the expression about so unprincipled a business), doing their work slackly in order to spin it out, and make the most they can out of it, and who do not scruple to pose as the virtuous advocates of honest workmanship. On this point the opinion of Mr. Burt as to the cause of a strike which took place at the Imperial Institute is worth noting. The ostensible reason for the strike was the subtlety of the plasterers' work. Mr. Burt says:—

"We engaged a foreman, Thompson, at a weekly wage, to do such work as was not let by the architect. The work under his direction commenced in March. The plasterers struck against this foreman after the work had been in progress about a month. As at that time the joiners had just struck, we took no active steps to controvert the action of the plasterers, and they remained out for two months or more, when, having obtained a considerable number of joiners, the plasterers started again under a new foreman. Mr. Otley says that they struck because of piecework. We do not know really why they struck, except that they did not like the foreman, who made them do a day's work. The statement I have made will show that Answer 17,324 is directly opposed to the facts, as is also the assertion that Thompson, the foreman, was one of the biggest scammers in London. That was the charge made. He did work for us for a number of years, during which we did not have a single instance of his work having failed, or been found fault with. Answer 17,328 is not in accordance with the facts. The work was not subtle when the men struck. The men struck against Thompson because he insisted upon their doing a fair day's work."

We will give one more quotation from the evidence of the builders; the question was asked by Mr. Austin:—

"Am I to understand from you, gentlemen, that the workmen in the building trades have deteriorated to that extent which you have mentioned, as compared with twenty years ago?—(Answer, by Mr. Wright.) The whole object, at the present day, is to do as little work as possible."

You say that they do not do as much work to-day as they did twenty years ago; is that the fact? It is a fact. We find that the work costs us double now what it did twenty years ago."

Such is the experience of the employers of building labour at the present day; and it certainly affords a significant commentary on the claims of the labour representatives, that they are all in favour of excellence of workmanship. Still more significant, perhaps, is the evidence of Mr. Bridgman, another member of the Central Association of Master Builders, as to the degree of interest which the trades-unions feel in securing excellence of workmanship:—

"I hear out what the previous witnesses have said, that the trades-unions do not discriminate between the good workman and the bad workman. I have put this question myself to delegates from the Union, asking them if they can guarantee that the men belonging to their Union are examined and are good workmen, and they say that they cannot do so, and that they take anybody, but that we have the power, after we have employed a man or have engaged a man, to discover whether he is a good or bad workman, and we have the power of discharging him."

Just so; and then, as has actually been known (we are confident some of our readers can recall more than one instance), the other men will strike because the incapable or idle one has been turned off. However the

* The italics are ours

trades-union leaders may evade the point, and declare that they have never formally given instructions to do work slackly, it is evident that it practically comes to that, and that the organisation of the unions is directed not to secure good work but to secure good pay. This latter is a perfectly justifiable end in itself, if there is an equal desire that the work should be well done; but the policy of combination to secure good wages entirely irrespective of good work is one of the meanest and most contemptible policies that any class of men could espouse; and we say that, on the evidence before us, that is the policy pursued by the new trades-unionism. If they wish their good intentions to be credited, let them proceed at once to alter all that; let them teach their members that the first and highest duty, and what ought to be the highest pride, of men engaged in any work whatsoever, is to do their work as well and as efficiently as possible, and that only when that condition is fulfilled have they a moral right to agitate for the best pay possible. When that position is fairly taken up and professed, then we may be ready to believe in their professions of anxiety for the improvement of workmanship—and not till then.

That this organised indifference, as it may be called, as to the paramount duty of doing one's work as well as possible, is responsible for a great deal of the bad work that is done, we are thoroughly convinced. But at the same time we quite concur with the remark of Alderman Taylor that the workman must not bear the whole brunt; that if there are bad workmen, there are also bad architects and bad builders; though in regard to these again we are inclined to think that a good deal of the fault lies not so much with individuals as with a system. We have before expressed the opinion that for a great deal of bad architecture and bad building in the present day the commercial system of rapid building for the sake of quick returns is responsible. It is impossible that good architecture can be designed in a hurry and against time, and it is exceedingly difficult to carry out good building under those circumstances; while in regard to the builders we have also to take into account the baneful effect of this hurried building, and of the competition for low prices, on the execution of the work. In the present day, with regard to all events to all buildings which are erected with a view to a commercial return, quantities are everything, and it is probable that in many cases the nominal "builder" hardly sees the drawings at all—certainly has not time to study them; he estimates on the quantities merely, and has to cut down his prices as close as he can to have a reasonable chance of obtaining the work. If the public want this they must have it; but it is not the way to secure either sound building or good architectural design. In regard to the architects one important point is touched on in Mr. Fleming's paper, and returned to by Mr. Verdon in the discussion, viz., that architects are in the present day far less in touch with the working man than formerly. Mr. Verdon says that it often occurs that a workman engaged on a building knows of something which the architect ought to know about, "but the architect would be very chary of speaking to the workman." If that means that the architect would think it beneath him to discuss a matter with a man working on his building, or hear what practical suggestion the workman had to make, we should think such architect a fool for his pains, or his false pride. We cannot say that we have encountered that sort of architect; we have no doubt he exists; those whom we have known most about would think it both a pleasure and an interest to hear what a good workman had to suggest about the work he was engaged upon, and would have sense enough to know that they might very probably get something useful from him (unless he were a new-school unionist, thinking more of his pay than his work).

Granting the higher moral standard

in the workman, which Professor Garnett desires, were established, we should still have before us the question of his technical training. Most people who have given any thought to the subject seem to be of opinion that, however we may regret the decay of the apprentice system, we are not likely now to see it revived to any great extent. To supply its place we must have technical training, and in regard to this the suggestion of Professor Garnett deserves serious consideration; that the technical training, to be of the best effect, ought to be given in connection with each trade, and not as a theoretical training apart from the trade, a kind of preparation for taking up handicrafts generally. For one thing, it does not appear that youths who intend going into handicrafts take kindly to abstract or theoretical training in geometry, mathematics, &c.; very naturally, they do not see the immediate connexion between this and the business of learning a handicraft and making a living. Teach them the theory along with the craft; as Professor Garnett puts it, bring the class into the shop or the shop into the class, and there would be much more interest taken in the theoretic training, because its practical application could be demonstrated on the spot; and moreover the learners would be caught by the theoretic teaching in the middle of their handicraft work, instead of having to make a special excursion to seek for it. This suggestion seems to us one of the most valuable which was thrown out in the discussion at the Association.

One other point we may allude to; the testimony borne by Mr. Fleming—a testimony which we did not require, but which he was quite right in accentuating—as to the really practical result of the efforts of the Plumbers' Company to improve the standard of knowledge and of work in their trade. There is no doubt that the effects of their efforts are real and important; and what they have been able to do other companies could do for their respective trades, if they went to work in the same spirit and with the same energy.

THE FLUSHING CISTERN QUESTION.

WE have already, in last week's report of the proceedings of the London County Council, quoted the recommendations made by the Public Health and Housing Committee as to the quantity of water which should be required to be provided in flushing cisterns for water-closets, and including the recommendation that the maximum of "two gallons" at present prescribed, by the Local Government Board, for the London districts, should be altered to "three gallons." Since then we have received a copy of the report of the Special Committee of the Sanitary Institute appointed to inquire into and experiment upon the action of various charges of water in clearing water-closets and drains. This report was communicated to the County Council, and is, we may probably assume, the real basis of the report of the Public Health and Housing Committee, but it gives much more detailed information than was included in the latter report.

The special experiments for the purpose were carried out as follows (we quote from the report of the Sanitary Institute Committee):—

"A series of drains was laid 50 ft. in length, partly pipes and partly half-pipes or open channels, of the following sizes and gradients:—

4 in.	1 in 30	6 in.	1 in 30
"	1 in 40	"	1 in 40
"	1 in 75		

At the head of each drain was fitted a simple short hopper basin of a good type, with an "S" trap having a 2-in. seal, leading with a bend into the drain, the top of the closet basin being a ft. 3 in. above the drain. A good syphon waste preventer, discharging two gallons in 5 seconds and three gallons in 7 seconds, was placed 4 ft. 3 in. above the closet basin, and connected to the basin with a 1½ in. flush-pipe, care being taken that there should be a clear water-way of this diameter from the cistern to the basin; at the lower end of each drain a disconnecting trap was fixed—two different forms of trap in ordinary use were employed to each gradient. Six hundred

experiments were made in this series. Tables A and B and diagrams A and B show the results of these experiments, first with a two-gallon-flush, secondly with a two-and-a-half-gallon flush, and thirdly with a three-gallon-flush, the quantity of water in each case being carefully measured.

A further series of drains was laid 26 ft. long, partly pipes, and partly open channels, of the following sizes and gradients:

4 in. 1 in 40 | 6 in. 1 in 40

The same closet and waste preventer were used, and the experiments were conducted, as in the longer drains, with two different forms of trap, 240 experiments being tried.

From this description it will be observed that these experiments have been conducted under certain conditions only, with respect to water-closet, flush pipe, application of flush, and gradient of drain. Time has not sufficed to extend the experiments beyond the scope so far adopted, but the Committee think that further experiments on a more extended scale would be of service in elucidating the entire question.

The method of conducting the experiments was to place in the basin three lumps of artificial excreta (a mixture of soft soap, cocoa fibre, and clay) and five pieces of paper (newspaper). The contents of the flushing-cistern were then discharged, noting in each case how much material was left in the closet trap, how much in the drain, how much in the connecting trap, and how much passed through. All the materials were removed before the next experiment.

With reference to the materials used in the experiments, it should be observed that they would be more easily flushed out than actual healthy excreta matter.

The results of the experiments are stated as a general average, but are further illustrated in a series of tables appended to the report, giving the results in diagram form, as well as illustrations of the apparatus employed in the experiments. These ought to be studied by those who are concerned in sanitation; some of the results are rather startling. It appears that with a two-gallon flush, with a good type of short hopper closet, an average of 5 per cent. of the material is left in the trap, while with a three-gallon flush the trap is practically cleared, the retention being only 1 per cent. In regard to the drains the results are even more important to notice. More than once we have drawn attention to the fact that it is not only the cleansing of the closet basin and trap that is to be looked to, but the cleansing of the house drain and the adequate carriage of matter to the sewer. The experiments of the Sanitary Institute Committee show that with a two-gallon flush an average of 21 per cent. of the matter in the closet basin is retained in the drain-pipe, for the time; of course it will be cleared out more or less by subsequent flushes, bringing however fresh matter down to supply its place, and ensuring a permanently foul condition of the house drain. When it is remembered that in London a large majority of the house drains necessarily and unavoidably run under the houses, it will be recognised what a serious matter this is. The experiments further showed that with a three-gallon flush only 3 per cent. of matter is left in the drain. It is to be hoped that these plain facts, brought out by a series of experiments conducted under the management of competent experts, will render it impossible for the London water companies (or some of them) any longer to assume the attitude of imposing upon their customers a limitation of the water-supply for closets which has now been shown, on unimpeachable evidence, to cause foul traps and foul drains. No one who understood anything of the subject could have any doubt of this, but the facts are now to be laid in black and white in the Sanitary Institute report; and in the face of that report we repeat with the more emphasis the advice we have before given to householders, not to pay any attention to the demands of water companies to restrict themselves to two-gallon flushing cisterns. By doing so they are creating a sanitary danger, and it seems to us impossible that any Court could support the demands of the water companies in the face of such a report as this, as it is equally impossible that the law on the subject can be allowed any longer to stand.

We may observe that the recommendations of the Sanitary Institute committee go far further than those of the London County Council. They recommend that a *minimum* of three gallons should be fixed, so as to compel all householders to use an adequate quantity of water, and that to prevent waste of water it should be limited to a maximum of 3½ gallons. We should have preferred four, as a safer margin, but we hope that at least the recommendations of this committee may be speedily acted on by the Local Government Board, which will fail in its duty to the public if it delays taking action on a matter so important to public health in crowded cities.

NOTES.

THE betterment question came before the House of Commons on Monday last, on a motion for the adjournment of the House, made by Sir John Lubbock, the practical object of which was to make a protest against the action of the Government in refusing to join in a Joint Committee with the House of Lords on this subject, and to urge a reconsideration of the position. At present the Government will not give way, and between their obstinacy and the childish pique of the County Council, London is likely to have none of its necessary improvements carried out. For it must be clearly understood that the raising of some part of the required funds by means of a betterment rate is not absolutely necessary in order to carry out these improvements. Even if we assume that such a rate is desirable, that is no reason why London improvements should be at a standstill because such a rate cannot yet be levied. The County Council can raise all the necessary money in the ordinary way, and they should do so, endeavouring meanwhile to obtain a legislative sanction for the principle of a betterment rate. We believe that the best course would be the appointment of a competent and impartial Royal Commission to inquire into the subject and to report whether such a rate is desirable, and, if it is, how it can be worked out in practice. As the Duke of Argyll points out in the correspondence on the subject, if a property is improved it pays a higher rate in consequence, because its rateable value is sooner or later raised. But if a property is to be loaded with a betterment rate, must not its rateable value be kept from being raised in consequence of the improvements? In other words, a property must not be twice rated for the same thing. Meanwhile the deadlock continues, and the most practical step is for Londoners to assemble in public meeting and urge on the County Council to go on with improvements whether a betterment rate is allowed or not.

THE Bath Town Council seem in the way to add another to the list of mismanaged and discreditable competitions, in the case of the designs for the Pump-room extension. After declaring loudly that this was to be a competition conducted on the most straightforward lines, they are now apparently desirous to adopt the design which was placed second by the assessor, which was sent in irregularly (the envelope containing no name or address) and which it seems to be now generally known is the work of their own Surveyor, whose duty it had been to draw up the instructions for competitors, and who by all rules of honour ought to have stood aloof from the competition. It seems to be disputed whether Major Davis, the Surveyor, was or was not formally instructed that he was debarred from competing; it is perfectly certain that if he was not so instructed he ought to have been, and that if the Council intended to allow him to compete they were playing false with the other competitors; and it is equally certain that it was the duty of any honourable man to have recognised that under such circumstances he

had no right to compete. The ex-Mayor of Bath, Mr. Murch, in a letter on the subject written in a very proper spirit, asked very pointedly whether Major Davis, as a member of an honourable profession, could possibly value success obtained in this way. As to the action of the Council in retaining the right to make their own choice from among the three designs placed first by Mr. Waterhouse, we see nothing to blame in the abstract. We have always maintained that it cannot be expected that the people who are going to pay for a building should give up all choice about it absolutely to any assessor, however eminent, unless the assessor has made that a condition of acting, which does not appear to have been the case here. In the majority of cases sensible men would recognise that they would probably be doing best for themselves in following the assessor's advice; they would probably be doing so in this case; but we do not blame them, on principle, for reserving a right of choice. But under the circumstances under which the second design appears to have been sent in, and under which the Council seem disposed to insist on its adoption, the matter is discreditable both to the Council and their Surveyor.

THOUGH expressed in language somewhat unnecessarily wordy and florid, Sir Frederic Leighton's estimate of German Mediaeval architecture, included in his address to the Royal Academy students last Saturday, is a very sound and judicious piece of criticism. It is, to be sure, pretty much what Fergusson, in much simpler language, has said already, but we presume Royal Academy students (unless the architectural ones are an exception) do not read Fergusson, and therefore it is as well that they should have had a just view of the weaknesses and defects of German architecture, not ignoring its merits, from their President.

THE students' designs exhibited to the public this week at the Royal Academy rooms are above the average in one or two departments, and perhaps rather below it in others. The designs for historical painting—"Joseph Interpreting Pharaoh's Dream"—are perhaps rather above the average, though there is no doubt that the painting by Mr. Speed, to which the gold medal has been awarded, is far in advance of the rest, and is a picture of great promise. Among the other designs No. 6 is clever and spirited, though rather stagey, the common fault of young artists in paintings of this class. The landscape—paintings for the Creswick and Turner prizes are at least quite up to the average; the greens seem to be the great difficulty. In these two competitions the prize has been gained by the same man, Mr. Harold Waite, who in each case is decidedly superior to all the other competitors, and of whom we ought to hear more in the future. The subject for the Turner Prize was "Moonrise before Sunset," a difficult subject in the way of lighting. No. 30, with a pale moon rising over a river, is a meritorious one; still more so, perhaps, No. 32, a scene in an inland harbour; Nos. 35 and 38 also deserve mention. The decorative designs—"design for the decoration of a public building"—are not as good as they sometimes are, and the one by Mr. J. B. Liston Shaw, to which the prize is awarded, though perhaps the best drawn as far as the figures go, is not interesting in subject, and not very decorative in effect; in a decorative sense No. 109 is better both in line and colour, though marred by the mistake of introducing a strongly-marked mosaic floor design in perspective in the foreground, which of course interferes with the "one-plane" effect proper to decorative painting. In the principal sculpture subject, "The taking down of St. Sebastian after Martyrdom," the gold medal has been given to a very weak design, certainly inferior to its neighbour, No. 176.

We have heard the explanation suggested that while the painters, who are in a large majority in the Academy, know absolutely nothing about architecture, and therefore seek the advice of an architect member in regard to the architectural prizes, they consider that they understand sculpture, and make the award irrespective of the sculptors. In architecture the gold medal has been given to the only design which has any claim to it, that by Mr. J. S. Stewart—subject, a provincial town hall; the other designs are nowhere. Among the designs done as classwork at the Academy are some good things, considering the circumstances under which they were done; several of the sketch designs for market halls are good, particularly No. 219; the 25^l. prize is given to Mr. C. W. Baker for a very good "design for a morning chapel." Among the attractions of the collection are the English travelling student's sketches of last year, by Mr. Stewart, the winner of the gold medal this year; and the very fine set of sketches, chiefly of Greek and Renaissance work, by Mr. Hart, the winner of the gold medal and travelling studentship in 1891. Some measured drawings of Newgate, by Mr. G. J. J. Lacey, which gained the first silver medal, are well executed, and of interest as representing a historical building which will probably soon be destroyed.

THE Prussian Royal Academy has decided on having a special exhibition of works by its members and honorary associates. Herr Wallot, the architect of the new Imperial Houses of Parliament, has been entrusted with the arrangement of the show, which is to be open during the Christmas holidays, and he has had a suite of rooms specially arranged for this purpose in the old Academy buildings at Berlin. Practically all the members will be represented by their best works, which are being brought together with much difficulty. English art will be represented by works of Sir Frederick Leighton, Sir John Millais, Mr. Alma Tadema, Mr. Herkomer, and Mr. Oulless. As there are several architects among the members and foreign associates, there will also be a small architectural exhibit, principally, however, of German work.

IN the current number of the Athenian *Mittheilungen*, Dr. Körte has a paper on the recently-excavated shrine of Asklepios between the Pnyx and the Acropolis. This shrine, it will be remembered, was found quite unexpectedly during the excavations in search of the Enneakrunos. Dr. Körte gives a plan of the whole precinct, which consisted of an irregular quadrangle space of about 17 inches length by 13 broad. The entrance was at the N.-W. corner, where the main carriage road to the Acropolis intersected a more direct pathway for foot passengers. Within this space were found the foundations of a small shrine, with the lower portion of a sacrificial table still *in situ*, a huge stone forming the mouth of a well, the bases still *in situ* of many votive reliefs, and a number of reliefs, one of which bore a dedication to Asklepios himself. The most remarkable of these reliefs are published in the present article—one, of quite unique type, represents a bearded man holding in front of him a colossal leg, on which is depicted in salient relief a very obviously varicose vein. The relief was probably dedicated by a successful physician. The remainder of the reliefs follow the already familiar type, *i.e.*, processions of worshippers approaching the god, and facsimiles of portions of the body healed. The most interesting part of the discovery is that from the early character of the masonry it is clear that the shrine was in existence long before the worship of the canonical god of healing, Asklepios, was introduced at Athens. It therefore took its rise from the worship of some earlier local "medical man." The same number of the *Mittheilungen* contains a paper with a full

discussion, of the composition of the Gjölbaski frieze.

WE hear that the experiment of setting apart a special room for architecture at the Exhibition of the Glasgow Institute of Fine Arts last year proved a complete success, and a committee has been formed to carry out the same scheme this year, in the hope of having an even better collection than last year. Circulars have been sent round to a number of leading architects asking their co-operation. One advantage for architectural drawings in the case of the Glasgow Exhibition is that the architectural room is not, as at the Royal Academy, a *cul-de-sac*, which visitors hostile to architectural drawings can avoid altogether. Drawings are to be sent in on January 10. Mr. Alexander N. Paterson, of 136, Wellington-street, Glasgow, is the Hon. Secretary for the architectural committee.

WE have received some particulars also in regard to an Exhibition to be held at Glasgow in the months of July, August, and September of next year, under the title of "Old Glasgow." This is to be a kind of historical exhibition, including views and plans of the city in past times; old books, newspapers, proclamations, &c.; spinning machinery, ship models, early Clyde steam-boats; old charters, banners, and insignia; regalia, plate, and weapons, personal ornaments, and other such memorials. There ought to be a great deal of interest in such an exhibition, considering the important position which Glasgow has so long held as a city.

IN our article last week on "Stone Statistics" we complained that no reliable figures respecting the output of stone from open quarries appeared in the annual Blue-book on "Mineral Statistics." We further showed that this was largely due to the circumstance that open quarries are not included in the operations of the "Coal Mines Regulation Act," nor the "Metaliferous Mines Regulation Act." There now seems to be some prospect of more detailed information on the subject. We learn that the Departmental Committee, appointed a short time since by the Home Secretary to inquire into the conditions under which the quarrying of stone, &c., is conducted, with the object of diminishing any proved dangers to the life or health of the workpeople engaged, has reported in favour of placing open quarries in the same category as metaliferous mines, and making the inspection of such workings a part of the duties of the District Mining Inspector. The Committee states that the percentage of accidents in quarries is extremely high, and is of opinion that remedial measures should at once be taken. It is suggested that, as a commencement, all quarries should be placed upon the same footing. It is certainly high time that something was done, but we fear that the love of danger, so characteristic of quarrymen in general, will never be stamped out by Act of Parliament; the majority of accidents are clearly traceable to the men's own foolhardiness. Only the other day, on visiting a quarry in the Sherborne district, where rough road metal is blasted, we discovered, on inquiry, that the powder used was ordinarily kept in a lime-kiln, and within 5 ft. of the furnace doors! On another occasion, when witnessing some stone-blasting experiments in North Wales, the fuse used was so short and burnt so quickly, that there was barely time to clamber up the sides of the quarry out of the way, before the explosion occurred, and large pieces of the stone fell within a few feet of us. The ladders and ways down to hole-quarries are generally of the most rudimentary description, and often dangerous. We have occasionally seen a man with powder and fuse under his arm, smoking a short clay pipe; and all directions as to tamping when the

charge is in the hole are frequently set at defiance. The cool manner in which quarrymen will proceed with their work when a steam-crane is lifting heavy stones over their heads is astonishing. A huge mass of overhanging rock has no terrors for them. They seem quite oblivious of danger; and more sober minds must therefore devise methods to prevent them from running needless risks. If the report of the Departmental Committee is instrumental in minimising these dangers it will have done very useful work; at any rate it cannot fail to be the means of furnishing more accurate information concerning open quarries.

IT must be confessed that persons often seem to go to law upon questions as to which there ought to be no kind of doubt. Thus, in the recent case of *Haynes v. King*, the rights of the matter appear to be quite clear. The plaintiff was lessee under the Ecclesiastical Commissioners, and in the lease was a stipulation that, "notwithstanding anything herein contained, the lessors shall have power, without obtaining any consent from, or making any compensation to the lessee, to deal as they may think fit with any of the premises adjoining, and to erect, or suffer to be erected, on such adjoining premises, any buildings whatsoever, whether such buildings shall or shall not abate or diminish the light or air . . . &c., enjoyed by the lessee." On the other side of the street in which the plaintiff's houses stood, and opposite to them, were four other houses, also the property of the Commissioners; and these houses were pulled down by the defendant, under an agreement with the Commissioners, and new ones were being erected by him which, it was admitted, would interfere with the plaintiff's light, and the question arose whether such interference was legal. We cannot understand how any doubt could have arisen, for, as Mr. Justice North said, "this is an express provision that the enjoyment of light by the lessee is to exist only until the lessors shall require to exercise the right expressly given to them by the contract." The plaintiff may not have understood the effect of the proviso, but to ordinary minds it is plain enough.

THE collection of pictures at Mr. Maclean's gallery in the Haymarket includes a fine replica, on a smaller scale, of Mr. Orchardson's picture "The Young Duke," which will be remembered a few years ago at the Royal Academy. In colour the repetition is perhaps superior to the larger painting. Among the water-colours are some interesting studies by Landseer, Holland, Wm. Müller, Mr. Alma Tadema, Mr. Thos. Collier, and others.

A COLLECTION of water-colour drawings by Mr. Weedon, at the Fine Art Society's gallery, consists of sketches in Sussex, Hampshire, and Scotland, not remarkable for very high artistic power, but showing a broad water-colour style, and a fine treatment of landscape composition in several instances. We may notice especially "Rye Marshes" (28) and "Downs above Chichester" (41); the latter a charming work.

WE are frequently under the impression that we have come across the most unreasonable possible specimen of the demands that are made on competing architects, but there always comes another behind to beat the record. The committee for the new Sandown Conservative Club competition seem to have achieved this. The club is to cost 1,000^l. (a sum which, by the way, looks as if Conservatism was not in a very flourishing state at Sandown); the plans are to be drawn to working-drawing scale of eight feet to an inch; the architect whose design is accepted is to have the magnificent sum of five guineas, and the next in order of merit two guineas. "The

plans obtaining the first prize are to remain the absolute property of the club, no guarantee being given to employ the architect of the selected designs." Such is the simple statement issued to competitors. What sort of "architect" does the committee expect to attract by such a bait?

WE have received at the last moment, and too late to print, a very long letter from Mr. Howard Smith, the Corporation Surveyor of Carlisle, on the subject of Tullie House; which however is little more than a lengthened setting-out of the fact, which is not disputed, that the working drawings for the building were made in his office, and the erection of it supervised by him. There are only two new facts in the letter, and one of them is of no consequence. One is that he sent to Mr. Ferguson a sketch for the Castle-street front, and that it does not differ very much from the one designed by Mr. Ferguson. There is a good deal of similarity, though the difference is that between a surveyor's design and an architect's, as far as details are concerned; but as Mr. Howard Smith goes on to say that he never wished to claim credit for the Castle-street front (the only part of the design, apparently, for which he might have made some claim as to origination), there is no more to be said about that. His other correction is that the illustrations in the *Carlisle Journal* are not "taken from the finished building," as we concluded, but from sketches which he made two years ago. These are simply the elevations of Mr. Ferguson's "plan B," which are now at our office, put into perspective, with some unimportant variations, and the plan is nearly identical with Mr. Ferguson's plan. Mr. Howard Smith states that his letter is intended as a justification of the statement that "the plans and drawings for the alterations and additions to Tullie House were prepared by the City Surveyor." No one has disputed that they were—from Mr. Ferguson's original design. That is the point which has been omitted, and that is just the important one. We have the whole evidence before us, and our view of the matter has been confirmed by two other independent correspondents.

THE ARCHITECTURAL ASSOCIATION *London Workmen: their Education and Workmanship.*

THE ordinary fortnightly meeting of this Association was held on the 8th inst. in the Meeting Room of the Royal Institute of British Architects, No. 9, Conduit-street, Regent-street, the President, Mr. E. W. Mountford, in the chair.

The minutes of the previous meeting having been read and confirmed, the following gentlemen were elected members of the Association:—Messrs. R. E. Dennis, T. H. Russell, J. Bennett, and A. Bryer.

The President said that owing to the indisposition of Mr. Owen Fleming, who, although present, had attended that evening at great personal risk, the senior Hon. Sec., Mr. F. T. W. Goldsmith, would read Mr. Fleming's paper on "London Workmen: their Education and Workmanship."

Mr. Goldsmith then read the paper, which was as follows:—

The decision of the Architectural Association to set apart a day for the consideration of modern workmanship should be a matter for sincere congratulation on the part of all those who have the great question of good building at heart. The discussion appears to be peculiarly suited to this Association, for it has by its recent energetic and thorough reorganisation of the education of young architects shown that it appreciates the lines upon which large schemes of teaching organisation should be framed, and that, if it considers a certain course to be necessary, it is not deterred from undertaking that course by its magnitude or apparent difficulties.

The ultimate object of all architects is to obtain thoroughly good building. Our very motto proves this. We are now daily engaged in showing those studying our art how to design in beauty. What will be the practical result of our labours if we are not able to complete our task by

obtaining buildings built in truth? It may be urged that the responsibility of architects ceases with the education of themselves. Surely this is a narrow and indefensible position to take up. If architects fail to assert their rightful position as arbiters and leaders of workmanship, it is but reasonable to assume that others will fill their places, and it is a serious question whether any persons are so qualified to direct workmanship as those whose lives are devoted to a study of the question. If historical precedent is of any value, our existing knowledge leads us to suppose that the architects of the great Classic and Mediæval monuments which command our admiration and respect were in far closer touch with the workmen than we architects are to-day. The present position is mischievous in many ways. The architect, for example, is the person who creates in his mind the ideal building. He shows the nature of that building by his drawings, and describes its method of construction by his specification. But the actual realisation of his ideal must necessarily be the task of others, and the success of his work is frequently sadly marred by the carelessness or incapacity of the operatives. Criticisms of workmanship are now so frequent that they are almost regarded as commonplaces in most of our professional assemblies, and this is the reason why I am asking the honour of your close attention this evening.

It seems almost unnecessary to submit to an audience of professional men any extensive evidences of the way in which the average modern operative performs his duties, but we have the advantage of the presence with us tonight of representatives of the various Trade Unions and others interested in this question, and I propose therefore to deal with this portion of the subject more fully than I otherwise would have done. I do not wish to say that there are not a large number of thoroughly efficient and earnest workmen to be obtained at the present time. I would not even assert that workmanship has deteriorated materially during the last decade; but speaking of the capacity of the average building mechanic in London, I feel I am but the mouthpiece of my professional colleagues when I state that his work is very far below the standard it ought to reach. Let me ask the Operative Bricklayers' representative whether even 25 per cent. of the men who present themselves on a job are capable of executing a piece of good face brick-work. Even among these comparatively capable men, how many are able or willing to do a piece of really first-class work without constant supervision. Perpenders are not truly kept. The headers are not central over the stretchers. The joints are of uneven thickness. Bricks chipped and with angles knocked off are built in without thought. Care is not taken that the best face shows outside. Even with interior work, it is most difficult to get the work done properly. The average bricklayer seems to imagine that there is no necessity for the sides of bricks to be covered with mortar. A little scrap of mortar on the front edge, and some thrown into the joint from above when the brick is laid, is supposed to be sufficient to make a good joint, and the architect who ventures to ask for this system to be altered does not meet with a cordial reception. I came across a man the other day who had built a wall so carelessly that you could not tell the difference between a heading and a stretching course, and yet even this man was a member of the Operative Bricklayers' Society. An architect told me that he had to employ five men before he could get some salt-glazed brickwork decently executed. With regard to joiners, I fully recognise the difficulties under which the modern joiner does his work, but even on this basis, capable joiners are as difficult to find as capable bricklayers. The shop foreman of one of the largest London contractors told me that he only accepted one out of every four men who applied to him for work. The others were not able even to put together machine-made joinery to his satisfaction. To obtain a joiner able to intelligently set out full-sized rods is a matter of great difficulty, and we are, alas! too familiar with ill-fitting joints, badly-mitred mouldings, badly-fitting doors and windows. The joiners' show at the recent Workmen's Exhibition at Islington appeared to me very unworthy of the trade. Compare the joinery of an average suburban house of to-day with that of the Queen Anne and early Georgian houses of the same position, and see if the two will really bear comparison. I cannot deal with all the trades, but on all sides we find evidences of want of knowledge or want of care. The only trade where we find any evidence of progress is the plumbers', where the average quality of the work is distinctly high, but

this is probably owing to the energetic policy of the Plumbers' Company. When we turn to the higher branches of the trades we find the same lamentable story. An hour's walk through the principal streets of London is the best way to arrive at a conclusion on this point, and the work of the average brick-carver, stone-carver—and to a less extent the workers in metal and plaster—must be held to compare most unfavourably with the exquisite work that prevailed in the sixteenth and seventeenth centuries.

There is not even the excuse of great rapidity of work to offer. Work is really done at a much slower rate than it used to be. Several contractors have assured me that the price of labour to-day is 40 per cent. or 50 per cent. higher than it used to be, owing principally to the length of time men take in their work, and I have strong evidence to show that bricklayers are practically compelled not to lay more than an average of 400 to 500 bricks per day, whereas ten years ago the average per man was nearer 1,000. A comparison of priced bills of quantities of the present day with those of fifteen years ago is an instructive operation. I am not complaining of this slow progress of work. That, regarded on its merits, may or may not be desirable. I only refer to it to show that men have plenty of time to do their work properly if they can and will.

This state of affairs seemed to me so serious that I have taken great pains to verify my own experiences by conversations with all classes of workmen, foremen, and others engaged on buildings, and I am prepared if necessary to give other evidences of the unsatisfactory character of modern workmanship. If, therefore, the view of the matter I have presented is accurate, I submit that some definite steps should be taken, and I therefore propose at the close of this discussion to ask this Association to appoint a Special Committee to investigate the matter from the architect's point of view, and to see in what way the collective influence of architects can be brought to bear upon the artificers of London. I entirely refuse to believe that any large body of men following an honourable calling would knowingly or willingly practice that calling in a slipshod or inefficient manner. Mr. Llewellyn Smith, in his most able and exhaustive report upon technical education in London, tells us that the workmen "are now keenly alive to the evil of the present state of things," and if this view be correct, I can imagine that architects, who are by their position, uninfluenced by political and economic considerations and whose only object is to secure good work, will be able to exert a wonderful influence towards the levelling-up of workmanship. The fault is not the workman's, but the difficulties which beset his path while he was being trained.

Let us consider for a moment the question of apprenticeship. For many years past this has been steadily declining in London, and now it may be said to be practically dead. In some trades, we learn, it is replaced by a sort of quasi-apprenticeship, but in the majority of the building trades nothing has taken its place. Boys are taken as errand boys, and have to pick up the work as best they can. I am informed by persons whose knowledge of this question is great, that the average native London bricklayer begins as an odd boy, becomes a labourer, gets on to some speculating work in the suburbs, picks up some rough notion of bricklaying there, drifts back into the metropolis, and offers himself as a competent bricklayer, and on cross-examining two or three groups of bricklayers I concluded that there was much truth in this assertion. Many of the best mechanics working in London are, however, not Londoners at all. I have evidence of a convincing nature to show this, and in some cases the proportion of countrymen is fixed as high as 75 per cent. This is a statement which must be a cause of grave concern to the London School Board and the newly-formed London Technical Education Board, for it shows that the London boy is apparently unable to obtain the information necessary for him to take his place as an efficient workman.

This conclusion is strikingly emphasised by some statistics prepared by M. Llewellyn Smith of the percentage of boys—not even apprentices, but only boys—to the total number employed in the different trades. We learn that among bricklayers the percentage in London is nine against twelve in the whole country, among carpenters eleven against sixteen, among masons ten against thirteen, among plumbers twenty-three against twenty-six, and among painters eight against thirteen. If the apprenticeship in the London building trades is dead or dying, it becomes a question of the highest moment as to what is to

take its place. Matters cannot remain in their present condition, or the present unfortunate condition of affairs will assume disastrous proportions.

It is impossible in any survey of this character to avoid a consideration of the trade-unions. These organisations, founded originally on an avowedly protective basis, now practically have become representative institutions, and in addressing them we may fairly be said to be addressing the workmen themselves. With the many economic questions that hover round trade-unions I have nothing to do. My object in referring to them is to indicate the enormous influence they might exercise on the question of workmanship if they chose. I have been told over and over again that trade-unions are not formed to deal with workmanship, but I submit that it is to their interest to take up this question. In fact, I hardly see how they can escape it if they wished to do so. I do not know by what restriction the entrance to these societies is fenced about, but I imagine that some steps are, at all events, supposed to be taken to see that men entering their ranks have a right to do so, and, once admitting the elementary principle of selection, it is not difficult to conceive that this entrance selection might be made of real and great value. Surely the competency of the individual concerns the societies who represent the trades quite as much as the competency of aspirants for membership concerns our own representative body, the Institute of Architects, and to allow half-educated men to "slide in"—to use the expression of a meeting of workmen with which I argued this question—is to seriously discredit the position of the trade-unions themselves. In many cases it is quite possible to fix the minimum amount of knowledge a man should have to entitle him to call himself a bricklayer or a joiner. We see an example of what may be done in this direction by the recent movement in favour of the examination and registration of plumbers. Not only is this test largely undertaken voluntarily, but the action of some of the provincial County Councils in determining that their work shall only be executed by registered plumbers is now being followed by the London County Council, and legislation is contemplated on the subject. I commend this line of thought to the Trade Union delegates here this evening.

One of the most encouraging signs of the times, which deserved far more attention from architects than it received, was the recent National Workmen's Exhibition at Islington. This exhibition was promoted by the London Trade Council. The object of the exhibition was officially declared to be, to exhibit individual handicrafts, to encourage skill and artistic taste in the worker, and to impart a desire to excel in the work undertaken. The idea of such a national competition as this, promoted by the men themselves, is altogether excellent, but the character of the majority of the exhibits in the building trades—again with the exception of the plumbers—jarringly on my architectural feelings and showed me what an immense field for reform lay open if only architects and workmen would consent to work together in cordial and sympathetic co-operation.

Turning to the City Companies, I desire to offer the strongest testimony to the good work being done by the Plumbers' Company. I have found evidences of the influence of this Company in most unexpected quarters. I do not know on what lines this Company frames its policy, except so far as the presence of workmen on its Registration Committee discloses it, but it is doing very real good, not so much by a lavish expenditure of money, but by exercising a far-reaching influence over the trade as a whole with an admirable result. Another Company which displays great activity is the Carpenters' Company, although their influence on the trade, as a whole, is not very apparent. I have tried to discern the cause, and I would venture to ask those guiding the policy of this Company, whether the advantages of the high theoretical standard that they maintain does not tend to divert their attention from the main question before them, into channels not directly bearing upon the improvement of the ordinary carpenter and joiner. Other Companies that are free from the reproach of doing nothing in this direction are the Joiners', Painters', Plasterers', Tybers' and Bricklayers', and Blacksmiths'. I am sorry not to be able to include the Masons', and as to the Paviers', I have no information.

But however great the influence of these Unions, Exhibitions, and Companies may be, they can after all only encourage the production of good workmen, they cannot themselves produce them. This can only be done by definite teaching, and as the revival of apprenticeship seems at least impracticable, we must look for organised technical instruction in another direction, viz., the technical

classes rapidly springing up around us. I cannot pretend to deal with individual institutions to-night, with one exception, the Shoreditch Municipal Technical School. This is the first instance of which I am aware in which a metropolitan governing body has itself established and maintained a technical school, and its striking success during the short time it has been established is a testimony to the need of such an institution. A municipal school of this nature has many advantages over private institutions, as it is more in touch with those for whom it is founded. If it is strongly felt, for example, that the teaching is impractical, the complaint can be brought before the member representing the complainant, who would be able to investigate the matter. I am informed that the establishment of this municipal school has not entailed any charge upon the rates.

Dealing, however, with the technical classes as a whole, I am afraid that their present influence on the question under discussion is of quite an unimportant character. The following statistics published last year are instructive:—98 carpenters were learning theoretical carpentry at the different London classes, and 65 were learning practical carpentry; 51 bricklayers took up theoretical, and 42 practical bricklaying; 33 masons were learning masonry; 341 plumbers were studying theoretical, and 247 practical plumbing; while 40 painters took up house decoration. The significance of these figures becomes fully apparent, when we realise that there are 136,000 men and boys employed in the Building Trades in London. Probably this year these figures would be greater, but it is evident that these classes as a whole, from some cause or other, do not attract the average boy. Whether prejudice is to blame, or want of funds, or insufficient advertisement or impractical teaching I cannot say. Each particular class requires to be considered on its merits, and possibly the different causes I have indicated may, with others, be found operating in different degrees, according as the class is organised and managed. There is, however, a vast field of work urgently needing, I submit, the active intervention of the architect.

Now, Sir, we come to the crucial question upon which we are met together to confer. What is to be done? I anticipate a practical unanimity from nearly all speakers, that matters ought not to be allowed to drift, but I am too well aware of the extraordinary difficulties of the situation to attempt to prescribe a universal remedy. This can only be done after a long and patient inquiry by persons far more able to undertake such a task than I have been. I appeal, therefore, for any suggestions to be taken purely as tentative ideas that I have been led to form as to the lines upon which our future action should be based.

It will have been gathered from my remarks that I feel that it is time for architects to collectively move in the matter through the agency of this Association. I propose presently to ask this Association to sanction the appointment of a Special Committee of Inquiry to thoroughly investigate the matter from the architect's point of view, upon the same lines as the Special Architectural Education Inquiry Committee. I would refer to this Special Committee the question of appointing a Standing Technical Education Committee, composed, if possible, of an equal number of representatives of the Royal Institute of British Architects and of this Association; and I would define the functions of this Standing Joint Committee somewhat as follows:—(1) To place themselves in communication with the Building Trade Federation and the different building trade-unions, and to endeavour to arrive at an understanding as to the minimum amount of knowledge a man should possess to be eligible for election to the unions. (2) To supervise the organisation and working of the various trade classes in the Metropolitan, and to indicate where there appears to be a need for further classes. (3) To approach the Technical Education Board and ask that their position may be officially recognised by that Board, either by being permitted to elect a representative on the Board, or by being regarded as its professional adviser on questions affecting the Education of the Building Trades, and that the Board, when allocating the grants in aid of Technical Education made by the London County Council, will give due weight to the recommendations of the Standing Joint Committee. (4) To ask the London Trades Council to be allowed to act as jury in any further Workmen's Exhibition so far as the Building Trades are concerned, and to set subjects for competition in the various trades. (5) To assist in the organisation of meetings of workmen to discuss questions bearing upon the workmanship

of the various trades, and to arrange for architects to be present and take part in those discussions. These draft references will serve to indicate briefly the lines upon which our professional action should run.

The power we architects have in this matter is considerable. Hitherto, we have been satisfied to stand aloof and watch the progress of events. I do not say now that the task I have sketched out should be lightly undertaken. It involves far too much, and will need all our energy and strength if we are to show much result. But I do submit, Sir, that I have made out a case for a most exhaustive and stringent inquiry by some of your ablest heads. If the deliberate report of this Inquiry Committee is that we ought to intervene, then let our action be swift, decisive, and determined. Do not let us swerve from our set purpose till we have set London workmanship, so far as it concerns buildings, on a thoroughly sound basis, and one worthy of this latter half of the nineteenth century.

The President said it was a matter of regret that the opener of the debate, Mr. John Burns, M.P., was unable to be present. He was sure that all would join with him in expressing their regret at his (Mr. Burns's) indisposition. Letters had also been received, expressing regret at their inability to attend the meeting, from Mr. Caroe, Mr. Paul Waterhouse, Mr. Leonard Stokes, and Colonel Bird, all of whom were desirous of taking part in the debate. He called upon Professor Garnett to open the discussion.

Professor Garnett said that he felt that the evils of which Mr. Fleming complained in his able paper were not to be cured by one sovereign remedy—any kind of quack medicine. As they would all readily believe, he was naturally a strong advocate of technical education, but he did not think that technical education was going to get over all their difficulties, and secure for them their first-rate workmanship. They wanted to start earlier than technical education began, and they should make first the man and then the workman. What they wanted to do was to provide such education in the public elementary schools as to induce boys to enter into industrial pursuits, and take a pride and delight in work, for its own sake, and not for what it would bring. The man who worked under the pressure of dire necessity to provide the needs of nature for himself and for those depending upon him was little better than the slave who worked under the slave-driver's whip. He only was a free man who did his work because he delighted in it; and who did his work as well as he possibly could because he would have thought it a disgrace to do it in any other way. He was not prepared to say how industrial morality was to be brought about. Anything that tended to raise the moral standard of their children would help them towards the object they had in view. He thought they might look with a great deal of hope in one direction, viz., in that of manual instruction in their elementary schools and in their continuation schools. If they could there get children to work for the love of that work—and to take a delight and pride in that work which they did, they would clearly not be working for what they obtained from it—then the pleasure in manual work would become a habit and second nature. There were many causes, he thought, which tended to produce indifferent workmanship, and Mr. Fleming had told them that bricklayers, for instance, were in the habit of using bricks, the arrises of which had been chipped and the corners knocked off—bricks, in fact, not suited for first-class face-work. He (Professor Garnett) had had a long and bitter experience in work of that kind. Some bricklayers were of opinion that it was the proper thing to use up all the material brought on the site—viz., making their employers' interest their own. But they did ill, and not well, for the employer in doing that. Of course, the habit of carelessness was one of the things they had to deal with, and that, again, was a habit they ought to try and cure in their elementary schools. It was just as easy for a man to set a brick so that the best face showed in the front of the wall. Over and over again they saw the bricks set the other way about for no reason except out of the habit of pure carelessness. One noticed sometimes a kind of code of honour amongst workmen to help one another, and in many cases they agreed that to do their work badly was good for trade. Professor Garnett then mentioned the case of a working plumber who did his work in first-rate style in all jobs on which he was employed, excepting in one particular instance, and then, when his attention was called to the bad work, he replied,

"Did you think, sir, I was going out of this building without leaving anything behind for the mate?" They might look to the schools to educate the rising generation, but they must look to the trades unions to improve all those who were already in the trade. It was a good thing perhaps for the trades unions to look after the rates of wages and the hours of work, and that now and then a strike should take place in one particular branch of the trade; but it would be a good thing if the trades unions were to devote a good deal of their energies towards educating the workers up to a high moral standard. Although he did not think that technical education was going to cure every fault, it did not diminish the necessity of technical instruction amongst workmen. He thought that technical education had interested workmen, but the question was, how were they to encourage them to go into schools in which thoroughly scientific education was provided? He thought educationalists had made a great mistake in forcing their apprentices to attend classes in mathematics and geometry. If they wished to get the boys interested in their education they must teach the trades separately. They must have a class of geometry for the metal trade workers and for carpenters and joiners, and similarly they must teach artificers mathematics, and so on. If they were to teach effectually they must bring the class into the shop or the shop into the class. If the blackboard and the machinery were separate, the education would be a failure. The skilled student could attend a lecture on geometry and take notes of that lecture, and go home and in a few weeks reproduce that lecture in an examination. But the average workman could not do that, as he has not been trained to take notes and to remember. He must have the opportunity of seeing all the details of making a thing, and then he would never forget how he used his hands in that particular work. They must teach the workman to use his hands, and not simply his ears and his eyes. With the student it was the eyes, the ears, and the brain; but with the workman it was the hand to a great extent that took the place of all the other organs. If they were to make a success of technical education, then they must carry the trades along with them. He hoped that if technical classes were developed in connexion with the Architectural Association, or any other institution in London, that they would never lose sight of the desirability of establishing committees of masters, foremen, and journeymen builders who would superintend the classes and work.

Major Isaacs said that Mr. Fleming very properly devoted one paragraph to noticing what had been done by the City Companies in regard to technical education, and had referred to the Plumbers and other Companies. He (the speaker) wished to say a few words about the Paviors Company, as Mr. Fleming had told them that he possessed no information about that Company. Fifty years ago the Paviors Company were absolutely without funds, and were looked upon as quite an extinct corporation. Some members of the paving trade, and notably Mr. George Burt at the head of them, very much desired that it might be reconstituted, and they set themselves to work to discover what could be best done. They offered prizes for essays on making carriage ways, their offers being largely responded to, and they were still devoting their energies to fostering technical education. Mr. Fleming had referred to the influence trade unions could exercise with respect to the technical education of the working men. He (Major Isaacs) might tell the members of the trade unions who were present that night that they had to devote themselves to educating the British public as to certain matters. They had got to remove prejudices which were fixed in the public mind and also in the minds of the men in the profession to which he belonged. He wanted them to disabuse the public mind of the idea that they did not encourage individual excellence. That had been urged against them over and over again. It had been said that they had tried to bring every one down to one level. They knew that was a grave and crying accusation. Trade unions, if they would take a word of warning from him, would endeavour to disabuse the public mind, and the members of the architectural profession, of that opinion. The trade unions of the present day were charged with laying it down as an instruction to those who were members of the union that beyond a certain amount of work no more should be done. He gave the statement as he had heard it, because it was necessary that the public mind should be disabused of the idea that such teachings prevailed in the trade unions. He was surprised that

Mr. Fleming, whilst referring to brick and joiner's work which was done in the sixteenth and seventeenth centuries, did not go a little further and take them to the time of their great master, Sir Christopher Wren. He wondered that he did not tell them to look at work, not only ecclesiastical, but also work of a domestic character, some of which might now be seen in the City of London. He wondered that Mr. Fleming had not asked them to delight their eyes with evidences of exquisite brick and joinery work to be seen in some of the lanes and courts and alleys in the City of London. Where were those bricklayers educated? He thought it was a pity that the good old system of apprenticeship was being allowed to die out. He thought that there was a great deal in a respectable boy being sent to a respectable member of the craft and being bound for seven years and taught his craft and coming out an accomplished and efficient workman. How craft education was given at the present day passed his understanding. He had great faith in the new institutions which had been started. He had listened to all that fell from Professor Garnett as to the class-room and workshop, and he believed that the solution of the problem was to be found in the polytechnic institutions. They had received a very large amount of assistance from the public companies and from the Charity Commissioners, and from private individuals.

Mr. J. Verdon, Secretary of the Building Trades' Federation, said it was a fact, as Mr. Fleming stated, that there were not 25 per cent. of bricklayers who were efficient, it was to be deplored all round. Mr. Fleming had stated that he had seen a wall so carelessly built that you could not tell the difference between a heading and a stretching course. There was no doubt that that was a very bad case indeed. Probably Mr. Fleming saw that wall in some speculative work in the suburbs of London. Going a little further as to the question of trade unions, he did not believe that there was any trade union of the present day that did not advocate or believe in technical training for working men. As workmen, it was necessary that they should have technical education, and that technical knowledge of their craft which would enable them to follow out the instructions of the architect and builder. With reference to Professor Garnett's assertion that some workmen did bad work, because they thought it was good for trade, he (Mr. Verdon) could only say that he never saw any working men who believed that bad workmanship made it good for trade. He could only say that the representatives present that night denied that *in toto*. They did not believe it. He thought that the project under consideration would be the means of drawing the three classes, viz., the architect, the contractor, and the working man, more closely together, and so bridge over the gulf that had divided them in the past. He noticed that Mr. Fleming very often took the opinion of a contractor. It very often occurred that when a workman was engaged on a building that he knew of something which he knew it was necessary to send to the architect about, but the architect would be very chary of speaking to the workman. The workman must keep on with his work, and the fact was that neither the architects nor the master builders were in touch with the workmen. With reference to piece-work, a man generally was obliged to take work at such a price that he could not do full justice to it. With regard to the education of the boys or the workmen, he believed that was a question which the trade unions took a great interest in. As to the boys, he could not see anything at present to induce him, as a father, to put his boy into the building trade. A father would like to know that his son was learning a trade and gaining a sound technical knowledge of that trade, so as to enable him to take a pride in his work, and which any employer would be proud of having. Nobody realised the necessity of educating the workmen more than they did themselves. They realised that there was more education and more technical knowledge required in the trades. Then came the question as to what should be done, and that was a difficult matter. He might say that he believed there was not a working man in that room who would not support any suggestion which would have a tendency to draw the three classes together, and then the friendship would grow and continue.

Mr. Alderman Taylor said that it appeared to him that the question of technical education was somewhat one-sided, because it seemed that the responsibility for all the evil that the building trade was suffering from was endeavoured to be fixed upon the shoulders of working men. That

was an argument which he, with all due deference to Mr. Fleming and to the Architectural Association, and to the Master Builders' Association, entirely repudiated. Working men were children of circumstances. It was necessary to probe that question so that they could get at the cause of the evils complained of. He considered there were several causes, and, in his opinion, they were not very far to seek. The cause, in his opinion, rested with the British public. The British public had first to demand good work, and they would get it. The question certainly lay more with the British public than it did with the British working man. He had served twenty-two years as a practical workman in London, and he claimed to know something about their trade. He certainly thought that the workers were, in a measure, responsible for some of the evils complained of, but so also were the Master Builders' Association and the master workmen. If there were inferior workmen so there were inferior masters and inferior architects as well. He did not think that the inferior working man, who was certainly the weakest and the least educated, ought to bear the whole brunt of that, but he thought that they ought to all be prepared to share it equally. He might say that he was very pleased with Mr. Fleming's suggestion with regard to the joint committee, because he thought it was more a question of misunderstanding than anything else. What had been said as to orders and instructions going out from the various trades unions was certainly a misunderstanding and a very grave one, for nothing of the kind had ever emanated from any of the trade unions. If the trade union to which he belonged were to do such a thing he should wash his hands of it to-morrow. He trusted that all present would take it from him that such instructions as those which had been mentioned had never been given out from any of the trade unions connected with the London building trades. They all felt the absolute necessity of technical education, but good workmanship did not rest half so much with technical classes as with the British public, the builders and the architects who should insist upon good workmanship. He did not wish to say anything against the builders or architects, but what was the good of technical education if they were not allowed to put that knowledge into the work? He thought that if they would teach the British public that cheapness was not everything, it would do much more than anything else to educate workmen generally. The railways had done more to make inferior workmen than anything else owing to the sub-letting to various building contractors, and he believed that the London School Board had had more to do with the demoralisation of the working men than anything else, for nobody else had been more instrumental in introducing fourth and fifth-rate builders into the trade. It was simply a question of competition with the architects, and it was simply a question of competition with the builders and the workmen. The public having required buildings the architects in order to make the plans and designs look as well as they could when they were submitted, made them as elaborate as possible. When the tenders came in there were the builders one after another cutting down the prices instead of arriving at one conclusion with regard to the price of the work. He had known a case in which there had been a difference of 100 per cent. between the highest and lowest tender out of twenty.* He thought there was a mistake somewhere. They found then that when the builder had secured a tender it was almost a matter of impossibility for him to bring the work out at a profit. Who was the sufferer in the long-run? The poor British workman! They knew from experience, and very bitter experience, that very often the foreman of the job was responsible for the work which was not carried on as it should be. What were general foremen supposed to be? A general foreman was expected to be a dissembler. The question for the last twenty or thirty years had been cheapness and facility to get over the work; but it did not matter how it was got over. They might depend that as soon as the British public had been educated up to demanding good workmanship the supply would be equal to the demand. Drawings looked very well on paper, but when they came to the execution of them it was a different matter altogether. They had no quarrel with good employers. They often sympathised with them. He sympathised with good employers because there were plenty of them who would be only too ready to have their

* Alderman Taylor may find such cases frequently enough in our "Tenders" column.—Ed.

work done as it should be done. They sympathised with the contractors who would do justice to their workmen. He thought that if something could be done in the direction mentioned for technical education he felt that a great deal of good would accrue from it, and certainly to the working man as well as to the British public generally.

Mr. Henry Holloway, who represented the Association of Master Builders, said in the first place he should like to say how much they, as master builders, appreciated the opportunity that had been given them of being present at that discussion, which, he was bound to say, he felt sure would result in good in the end. With reference to technical education and training he believed in the boy or student being allowed to carry out in practice what had been put on paper, so that he should thoroughly understand the trade to which he was apprenticed. Let the boys have some material to work with. Dealing with the question of apprenticeship he did not know that the working man was altogether at fault. A man with a family of six or seven children, with a weekly wage of 30s. or 40s., could not apprentice a boy unless he was prepared to pay a premium. Masters could not be bothered with boys as apprentices, and give them wages, unless they had a premium. A man who was in the position he had indicated could not afford to put his boy into a shop where he would only earn 3s. or 4s. a week for a few years. On the other hand, the master could not afford to give the boy 6s. or 7s. a week when the boy was doing practically nothing. He thought that some of the City Companies having large sums at their disposal could do something towards helping parents to apprentice their sons. He had no doubt in his own mind that general decay in workmanship existed. He would take one illustration with regard to joinery. The foreman of some large London works told him not long ago that there were not six men in the place who could go and carry out a job properly. He considered that the trade unions in some respects were answerable for the decay in workmanship, and he would tell them why. A few years ago a man would never have what they called a full wage until the foreman was satisfied he thoroughly understood his work. What was the present position? He could give them instances in his own personal knowledge where trade unions had compelled masters, or at any rate the young men, to insist upon having full money or leave the job. It came to this; if men could have full money without being efficient, there was no reason to be efficient. He maintained that if the unions insisted upon all the men having the full rate of wages they ought to see that all the men were thoroughly efficient. What he thought they wanted was a better feeling between the men and the masters. When the recent increase of wages was discussed the masters, in the face of the fact that they did not think there was any justification for it, but knowing that there was a spirit of dissatisfaction among the men, came to the conclusion that if they could meet the men in something like a liberal spirit there would be a better feeling of contentment among the men, and that the work would be done better. What was the result? Instead of that he did not believe that any master or master builder had ever had such an awful time as they had had since. When a workman was labouring under a feeling of discontent he could not do his work well. There was one question which might appear perhaps beside the mark, and that was drink. It was a very curious thing that some of the best workmen were men who became victims to the habit, which, if they wished to make themselves efficient, they would have to get over.

Mr. Max Clarke said that the very worst job he had ever seen was a building which was not by contract, but upon a schedule of prices on which there was a very large commission. He could say in the most emphatic manner that nothing could have been more badly done. Whether that was attributable to the men or the builder he could not say, but it certainly did not depend on the money. If bricklayers got notions into their heads that brickwork should be done in one way, and the architect thought that it should be done in another, it was a most unfortunate state of affairs. He quite agreed with what Mr. Fleming said about the joiners' work at the Workmen's Exhibition. There was no doubt whatever in his mind that the very best workmen drank the most, and exactly at the time when it was most inconvenient. His belief was that men from the North of England were much more provident and industrious than I. don men.

Mr. Thomas Blashill said that he heartily

agreed with nearly every word of Mr. Fleming's paper, and he was glad to see that the discussion had reached such a high level from every point of view. He should not mention any details which might have occurred to him as to the habits of masters and workmen, feeling that if they were to have the proposed committee, things of that kind could very properly be threshed out then. He was fully convinced, from his own experience, as to the difficulty of getting good workmen and work. He thought that if they wanted good workmen they would have to do in the future what they had done in the past, and take them from the country, ready made. Now and then they came to London to better themselves. If they could get the committee together he was certain that good would come of it, not only to those trades, but to London also.

Mr. Searles Wood having proposed a vote of thanks to Mr. Fleming for his paper,

Mr. S. Beale in seconding said that he thought they were attempting to make bricks without straw. They were seeking to have a first-class technical education for the working man, and they had the South Kensington and the whole of the City Guilds working together to advance technical education, but they found from Mr. Fleming's statistics that only a proportion of 1 in 150 of the workmen attended those classes last year. If that was the result, with the forces at work, there was undoubtedly something very wrong in the way they had approached the question. It appeared to him that the inability of the men to produce good work did not rest on the fact that they did not know how to do it, but on the fact that they did not care whether they did it properly or not. With regard to the question of wages, although it had been touched upon, he had not heard a word on the subject which was ringing in many ears at the present time, and that was the subject of the "living wage." If they considered the question in that light he thought they would get near the solution of the difficulty. The question of the living wage was the key to the whole position, for without it no man would take the slightest interest in his work. The working man must have a fair share of the work he produced; a fair day's wage for a fair day's work.

Mr. Sidney Wells, of the Battersea Polytechnic, said that the difficulty they had to contend with was to get workmen to follow the proper trade course. It was the greatest difficulty to persuade men to follow a properly organised course in which things could be learned in their proper order. Without that they could not make technical education a success. He hoped that in any movement which was taken that the London Polytechnics would be taken into consideration.

Mr. C. H. Brodie, who was called on by the President as the Chairman of the Discussion Section, said that he should like to say that the success of the meeting was due to a large extent to the able chief secretary of the discussion section, Mr. H. A. Satchell. Mr. Satchell had not wished to take any part in the debate, and he had asked him (Mr. Brodie) to read a letter which had been received from Mr. Stanley Bird, as follows:—"I should very much like to be present at the discussion to-morrow, as the matter is one in which I take great interest, but, unfortunately, I am unwell, and not allowed out. With regard to head No. 3, some eight or ten years ago I proposed to the Company of Tylers and Bricklayers to revive the system of apprenticeship among bricklayers (in a modified way) in order to meet the difficulty of finding masters who would take boys to live with them as in the olden times, but I grieve to say that the proposal has most miserably failed on account of the difficulty in obtaining boys who were willing to bind themselves for a term of years and who would take to manual work, the majority of them wishing to become clerks, and a much greater difficulty in finding men capable of instructing them. Also when the boys obtained a smattering of their trade they thought that 'Jack is as good as his master,' and either became unmanageable or absconded. At the same time the National Association of Master Builders of Great Britain issued a circular to the building trades throughout the kingdom asking for their co-operation; they also issued a form of apprenticeship, but I am sorry to say that that too fell as flat as the efforts of the Tylers' and Bricklayers' Company. With regard to head No. 4, overtures were then made to the Bricklayer's Trades Unions with a view to obtaining its assistance, but the letters have been merely taken up and no further interest taken in the matter. An opportunity has again offered itself. The Carpenters' Guild have taken a building

(recently used as a school of art) in Great Titchfield-street, and have opened classes for carpentry, joinery, and wood-carving. They approached the Tylers' and Bricklayers' Company with a view to co-operation, and I am glad to say that a bricklaying class, supported by the latter company, has now been opened, where bricklaying is taught technically. It is a *sine qua non* that no one shall join the classes unless he is at present engaged in, or intends to take up, the particular trade as a means of livelihood. The Carpenters' Company are spending a large sum on this very desirable object."

The President in putting the vote of thanks said that he was very glad to hear Mr. Alderman Taylor say that the interests of the workmen and the architects were identical, because that was one of his (the President's) very strongest beliefs. They both desired what they ought to desire, viz., to get the best work obtainable, and if the workmen were as anxious to do it as the architects were to obtain it, they would be getting into a better line shortly. He thought that in everything that conducted to the well-being of workmen, no matter in what way it might be considered necessary, architects ought to support them. He was very glad to say that he had had very little experience of the incompetence of the workmen they had heard of. Perhaps he had been fortunate. He had never seen much work to which he could take any proper objection. He did not say that he had never seen any work that was bad, because that would be impossible, but taking the mass of the work, he had had very little to complain of, as far as the workmen were concerned. A good deal was charged against them, as Mr. Taylor said, very unfairly. Mr. Fleming complained, for instance, about chipped bricks. Those were very annoying to architects, and nothing could spoil the effect of work more, but he (the president) could not imagine a working man complaining to his foreman that the bricks were chipped, because, no matter how much it might annoy him, it would not be worth his while to complain a second time. It had been said also that the North of England men, in his opinion, were better than London men. That was not his opinion, and he had had experience, and was still having it, of both London men and northern men, and, taking them all round, he preferred London men to any men he knew. On the question of drink, he rather wished it had not been referred to.

The vote of thanks to Mr. Fleming, with which the name of Mr. Goldsmith was coupled, was put to the meeting and carried by acclamation.

Mr. Fleming, in reply, said he did not propose at that late hour to go into all the questions which had been raised that night. The subject was too great to be dealt with in a light way. He had been looking into that question for a long time, and had been over London investigating all the different shops and technical classes, and talking to the men and contractors. He could say that some of his most interesting conversations had been with the men, and the intelligence of some of our workmen was very remarkable, and he was sorry that it was not more fully utilised. The decay of apprenticeship was very much to be deplored. It was a great pity. They could never expect to have apprenticeship again as it was formerly. It became a great question as to what was to take its place, and that was why he gave them the figures as to the technical classes. It seemed to him that technical classes did not at present cope with the difficulty, and he thought that was partly because architects, builders, and workmen, for whose benefit the classes were run, were not actively interested in their success. He wanted to see the reorganisation of the London classes. They had three branches of the great building industry—viz., the builders on the one side, the men on the other, and in the centre the architects. He wanted the three classes to combine together and make the British public have good work. He would give notice that at the next meeting he should move the following resolution:—"That a special committee be appointed to inquire into the present facilities in London for the training of apprentices engaged in the building trades, and to consider and report if and in what manner the Architectural Association can usefully exert its influence towards the organisation of a complete scheme of education and its future supervision by architects."

The meeting then terminated.

BARRACKS, FETTER-LANE—NEW BRICKS for two BUILDINGS, 200 FEET to be erected at Holloway, near East, the plans, details and estimates being prepared by the R.E. Civil Staff at that station.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring Gardens, Mr. John Hutton, the Chairman, presiding.

Capacity of Water-closet Flushing Cisterns.—The adjourned report of the Public Health and Housing Committee respecting the capacity of water-closet flushing cisterns, the substance of which we published last week, was again brought up, the Committee recommending—

"That the Local Government Board be informed that the Council is strongly of opinion:—(a) That regulation No. 21, under the Metropolitan Water Act, 1871, should be amended so as to read as follows:—'Every water-closet cistern or water-closet service box hereafter fitted or fixed in which water supplied by the company is to be used, shall have an efficient waste-preventing apparatus, so constructed as not to be capable of discharging more than three gallons of water at each flush.' (b) That the requirements as to the supply of water to water-closets should apply equally to the supply of water to sinks used for receiving any solid or liquid filth. (c) That a regulation should be made which shall prevent cisterns being brought into use for supplying water for domestic purposes, or for foot-paths, so long as they directly supply a water-closet or sink used for receiving any solid or liquid filth. (d) That in all cases where any premises have a constant water service, one or more taps should be provided in connexion with the rising main for the supply of water for drinking purposes."

Mr. Westacott moved an amendment to strike out the words "not" and "more than" in recommendation (d), as, in his opinion, water-closet cisterns should be constructed so as to discharge at least three gallons of water.

Alderman Fleming Williams seconded the amendment, which was adopted, and the recommendation, as amended, was agreed to.

The other recommendations were also agreed to. **London Streets and Buildings Bill.**—The Parliamentary Committee brought up the following report:—

"We have finally settled the provisions of this Bill, Parts I. and II. of which were sent to the members of the Council last week and approved on the 5th instant. We have directed a copy of the remainder of the Bill to be sent to each member of the Council, and we recommend—

"(a) That Parts III. to XV. of the London Streets and Buildings Bill be approved; that the seal of the Council be affixed to a Petition for leave to bring in the Bill; and that the Bill and Petition be deposited pursuant to the Standing Orders of Parliament, with such verbal alterations (if any) in the Bill as the Parliamentary Committee may consider desirable."

In connexion with this Bill we have considered the petition (referred to us by the Council on the 5th instant) from the Society of Architects, asking the Council to include in it a power to the council of the society to nominate one person to sit upon any tribunal or tribunals created in substitution thereof.

The Council of the Royal Institute of British Architects appoints one member of the existing tribunal, and provision is made in the Bill for the continuance of this appointment. We are of opinion, after full consideration, that this representation of the profession is sufficient. We accordingly recommend—

"(b) That the Society of Architects be informed that the Council cannot see its way to alter the constitution of the tribunal provided for under the Bill."

Parts III. to XV. having been gone through and, after various alterations, agreed to, the recommendations of the committee were carried.

The Christmas Holidays.—On the proposition of Dr. Collins, seconded by Mr. Cornwall, it was resolved:—

"That no meeting of the Council be held after Tuesday, December 19, 1893, until Tuesday, January 16, 1894; and that there be no meeting of committees between Friday, December 22, and Wednesday, January 10, unless in a case of urgency which will not admit of delay."

The Council adjourned shortly before seven o'clock.

SANITARY INSTITUTE EXAMINATION. An examination for Inspectors of Nuisances, held in London on the 1st and 2nd inst., 131 candidates presented themselves. Questions were set to be answered in writing on the 1st, and the candidates were examined in person on the 2nd. Sixty-seven candidates were certified to be competent, as regards their sanitary knowledge, to discharge the duties of Inspector of Nuisances.

"A. A." LYRIC CLUB.—We may draw attention to the special smoking concert of this club, to be held on Thursday evening at St. Martin's Town Hall, to which all members of the Association are invited, and at which the President of the Association, Mr. Mountford, will preside. This concert takes the place of the one originally fixed for the 15th.

COMPETITIONS.

BOARD SCHOOL, LONDON.—At the meeting of the London School Board, held on the 7th inst., General F. J. Moberly, the Chairman of the Works Committee, presented the award of the assessor, Mr. J. Macvicar Anderson, President of the Royal Institute of British Architects, in the competition for new schools. The assessor's report was as follows:—"Having carefully studied the sixty-one sets of designs which have been submitted in competition for the proposed Board school in Fulham Palace-road, in accordance with instructions issued by you to architects, I have the honour to report that the design numbered 22 should be placed first, the author of which is thereby entitled to the first premium of 150*l.*, with the condition attached thereto as to employment; the second place to the design numbered 53, the author of which is thereby entitled to the second premium of 100*l.*; and the third place to the design numbered 37, the author of which is thereby entitled to the third premium of 50*l.* The cost of these three designs is respectively estimated by their authors to be:—No. 22, 22,138*l.*; No. 53, 18,965*l.*; No. 37, 19,850*l.*, in each case the estimate being for the school for 1,200 children, without the extensions. . . ."

The following are the names and addresses of the architects who submitted the plans which have been selected by Mr. Anderson:—Plan No. 22: architects, Messrs. Arnold Mitchell and Alfred M. Butler, of 16, Finsbury Circus, E.C.; Plan No. 53: architects, Messrs. Crickmay & Sons, of 17, Parliament-street, Westminster, S.W.; Plan No. 37: architects, Messrs. Leeming & Leeming, Victoria House, 117, Victoria-street, S.W.

EXHIBITION, BRISTOL, 1894, SUSSEX. As the result of an invitation to architects to take part in a competition for a new infirmary at Bridgnorth, South Shropshire, forty-four architects responded, and from this number the committee selected the following ten:—Messrs. Stephen Salter & Adams, of London; Messrs. Richmond & Cooper, of Westminster; Messrs. John Giles, Gough, & Trollope, of Charing Cross; Mr. W. C. Pite, of Bloomsbury-square; Mr. W. H. Woodroffe, of London; Messrs. Thomas Worthington & Son, of Manchester; Mr. William Henman, of Birmingham; Mr. Edward C. H. Maidman, of Edinburgh; Messrs. Meredith & Lunn, of Kidderminster; Messrs. Waddington & Son, of Manchester. The President of the Royal Institute of British Architects, Mr. Macvicar Anderson, was asked to appoint an assessor to help the committee to draw up conditions of competition and to select the most suitable design out of those submitted by the competing architects, and Mr. Alexander Graham, Vice-President of the Institute, was appointed. Acting upon his advice the committee have approved of and accepted the plans submitted by Mr. Edward C. H. Maidman. The assessor awarded the second place in the competition to Messrs. Worthington, of Manchester, and the third place to Messrs. Giles, Gough, & Trollope, of London.

THE PUMP ROOM EXTENSION, BATH.—At a meeting of the Bath Town Council on Tuesday, the Mayor said they were all aware that that was an adjourned meeting, and they would remember the occasion why it was adjourned, that the Town Clerk, the Chairman of the Baths Committee, and himself might consult together and bring up to the Council further information than they had at the moment. He need hardly say that counsel's opinion had been taken. From the inquiries he had made he found that their whole body was more or less mixed up in a matter which would seriously affect the hitherto untarnished honour of the city. A letter from the ex-Mayor, Mr. J. Murch, was read, in which that gentleman said:—"To me the most obvious breach of faith is this. Major Davis certainly received the commission to prepare the instructions to architects on the understanding that he would not compete. As a member of the committee I assented on that condition. I did so because I thought it would be irregular and unfair that he should prepare instructions to himself and possess from his position knowledge on points not included in the instructions but extremely useful to a competitor. Again and again I was told in the months that followed, Major Davis had repeated his determination not to compete. Now, however, we see the result; there are the designs of 'O,' with all the obvious proofs of superior advantage. The competitors who could only be guided by the instructions lose their chance. But even at the eleventh hour 'O' does not declare himself. . . . At all events it seems to me the duty of our Council is

clear—to pronounce disqualification on two grounds, the omission of the name and the breach of faith as to competition." The recommendation from the Baths Committee was then presented:—"That provided the Council are satisfied that the omission of the name of the author of the design marked 'O' was accidental, this Committee is of opinion that such omission should not disqualify him, the same not having been detrimental to the other competitors." Mr. Chivers asked if it would not be better that they should be quite sure who was the author of "O." Captain Peel-Floyd: There is no doubt about it. I met Major Davis yesterday, and he asked me as a friend and something else to support him. That shows that Major Davis is "O." Alderman Jolly then handed in the following notice of motion:—"That the resolution with respect to the plans marked 'O' as passed at the meeting of the Council on the 5th inst. be rescinded as far as it authorises that the work should be carried out." Alderman Chaffin asked if it was not impossible without notice to move that. The Town Clerk said it was quite competent for Alderman Jolly to give notice of his resolution to be placed on the agenda at the next meeting, while the discussion on the motion before the Council could be proceeded with. Alderman Chaffin moved that the meeting be adjourned. Mr. Ricketts seconded, and the motion was agreed to.

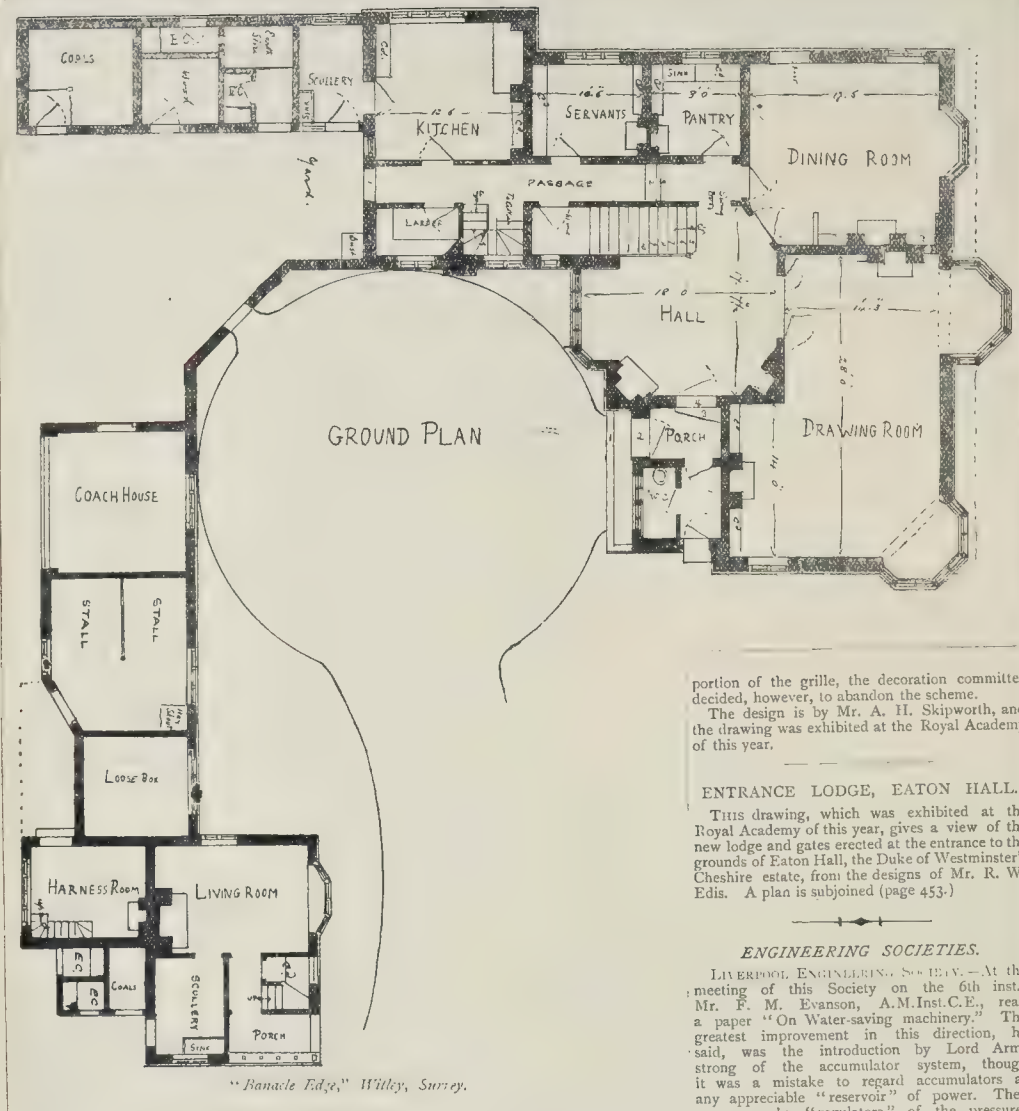
ARCHITECTURAL SOCIETIES.

THE LONDON INSTITUTION.—On Monday evening Mr. Arnold Mitchell delivered a lecture at the London Institution upon "The Origin and Development of the Church Window." Commencing with the narrow arrow slit of Norman castles, he showed how it had been used by the earliest church builders for lighting purposes, and the successive stages by which it had grown into such perfections as the lovely great windows of York Cathedral and King's College, Cambridge. The following stages showed two arrow windows close together; then separated by thick mullions, next an arch above uniting them, and the space above punched through with a circular hole, which, in course of time, as the "arrow slits" increased in number, was entirely composed of light tracery in stone. Other variations which followed were the introduction of the trefoil and the quatrefoil. The width of the windows increased, until in the eastern termination of the Angel Choir at Lincoln there were eight lancet-headed windows, or "arrow slits," close together, while the tympanum above was full of exquisite geometrical tracery.

SHILLIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The ordinary monthly meeting of this Society was held at the School of Art on Tuesday night. Mr. E. M. Gibbs presided. A lecture was delivered by Professor Anderson, of Firth College, on "The Architecture of Dalmatia, Roman and Renaissance." The lecture was well illustrated by lantern slides, the greater part of which were from photographs taken by the Professor during a recent visit to the district described. The lecturer commenced with a short, historical account of the country, describing its position and character, and the important part it played during Classical and Mediaeval times. He noticed especially the importance of the Venetian influence as testified in many of the buildings during Mediaeval and later times. The buildings in the various towns were described in detail.

CARLISLE ARCHITECTURAL, ENGINEERING, AND SURVEYING ASSOCIATION.—On the 6th inst. a meeting of this Association was held in the Town Hall, Carlisle, when Mr. A. W. Johnston gave a paper entitled "Styles of Architecture," in which he reviewed the various styles from the Early Grecian period down to the present time.

GLASGOW ARCHITECTURAL ASSOCIATION.—The usual monthly meeting of this Association was held in the rooms, 114, West Campbell-street, on the 5th inst., when a paper on "Hospital Planning," was read by Mr. A. N. Paterson, M.A., A.R.I.B.A. After alluding to the component parts and details of design, the lecturer, by reference to hospitals in Glasgow and elsewhere, described the varieties in plan from the double ward to the pavilion, pointing out the advantages and disadvantages of each. The general principles governing the planning of hospitals, he said, though few, admit of great variety of outline, resulting from peculiarities of site, &c., and in all cases architectural effect must be strictly subordinated to the various requirements. A discussion followed, and at the close a vote of thanks was awarded the lecturer.



"Banacle Edge," Witley, Surrey.

Illustrations.

NEW CHURCH, HUXTON.

THIS is the interior view of the church of which we published the exterior perspective view, and a plan and description, in the *Builder* for September 2 of this year, to which we refer the reader.

Mr. W. D. Caroe is the architect.

"BANACLE EDGE," WITLEY, SURREY.

THIS picturesque country house, designed by Mr. Basil Champneys, was built in 1891 and 1892, on a beautiful spot in Witley, commanding fine views of Blackdown and Hindhead. The contractor was Mr. Millar, of Witley.

As will be seen from the plan, the arrangement of the house and out-buildings is somewhat unusual, and certainly effective.

The perspective drawing was exhibited at the Royal Academy of this year.

PROPOSED BUSINESS PREMISES, EXETER.

THE materials intended to be employed in

carrying out this design were grey granite, Portland stone, and red brick, the arch, piers, and cornice to the ground floor being of tooled grey granite, and the remaining portion of the facade being of Portland stone and red brick. The width of frontage is 24 ft.

The architect is Mr. S. K. Greenslade, and the design was exhibited at the Royal Academy this year.

DESIGN FOR FRIEZE.

THIS frieze, which was exhibited at the Royal Academy of this year, was designed for a bathroom, to be executed in low relief plaster, silvered, and coloured with various coloured lacquers. The design is by Mr. Paton Wilson.

DESIGN FOR IRON GRILLE FOR ST. PAUL'S.

THIS design, representing one of three schemes in wrought iron for treatment of the quarter domes, was intended, as is seen from the drawing, to fill up the semicircular openings, 40 ft. long, at base, and was to have been entirely gilded on the face. After seeing a full-size model of a

portion of the grille, the decoration committee decided, however, to abandon the scheme.

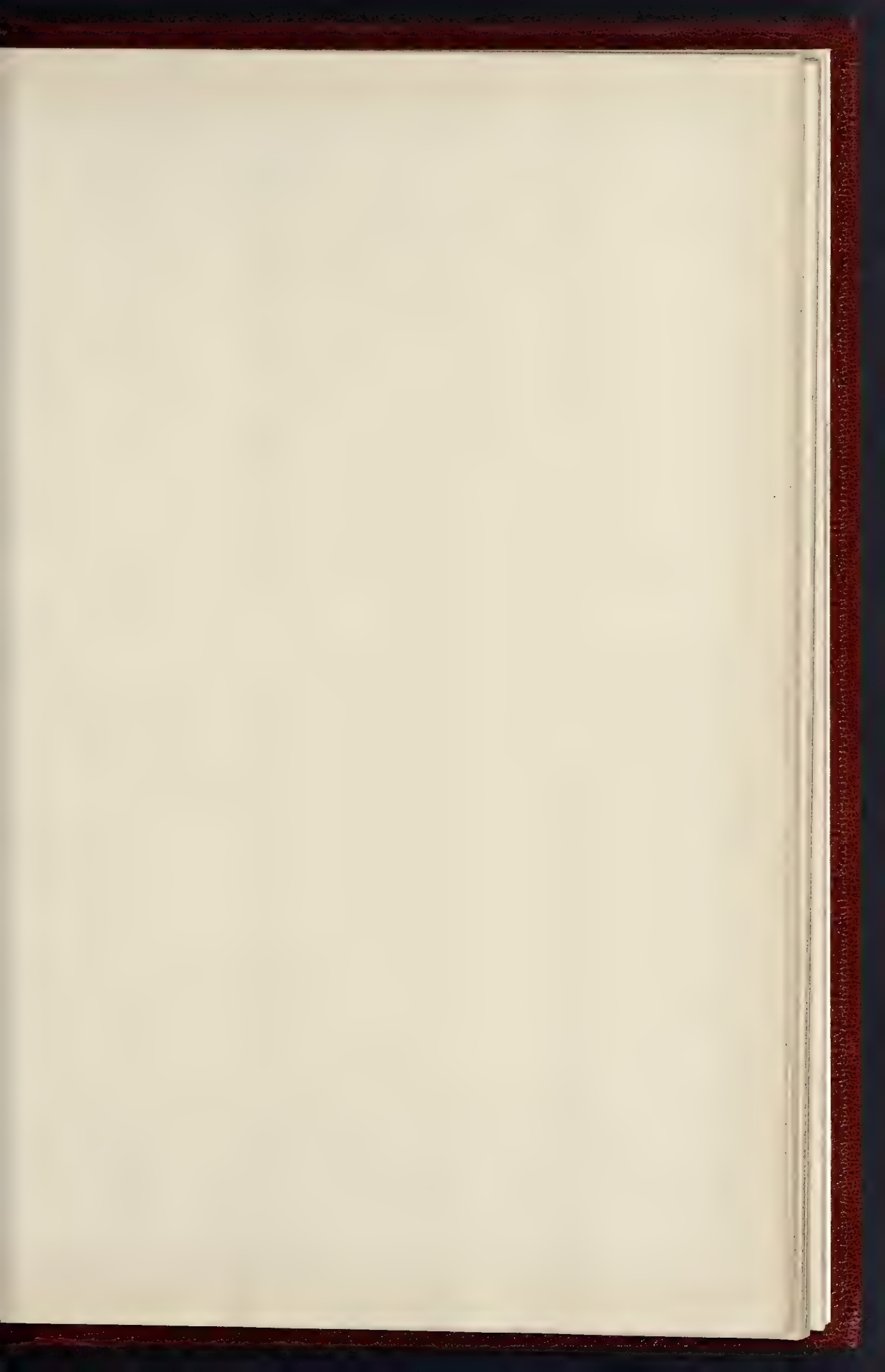
The design is by Mr. A. H. Skipworth, and the drawing was exhibited at the Royal Academy of this year.

ENTRANCE LODGE, EATON HALL.

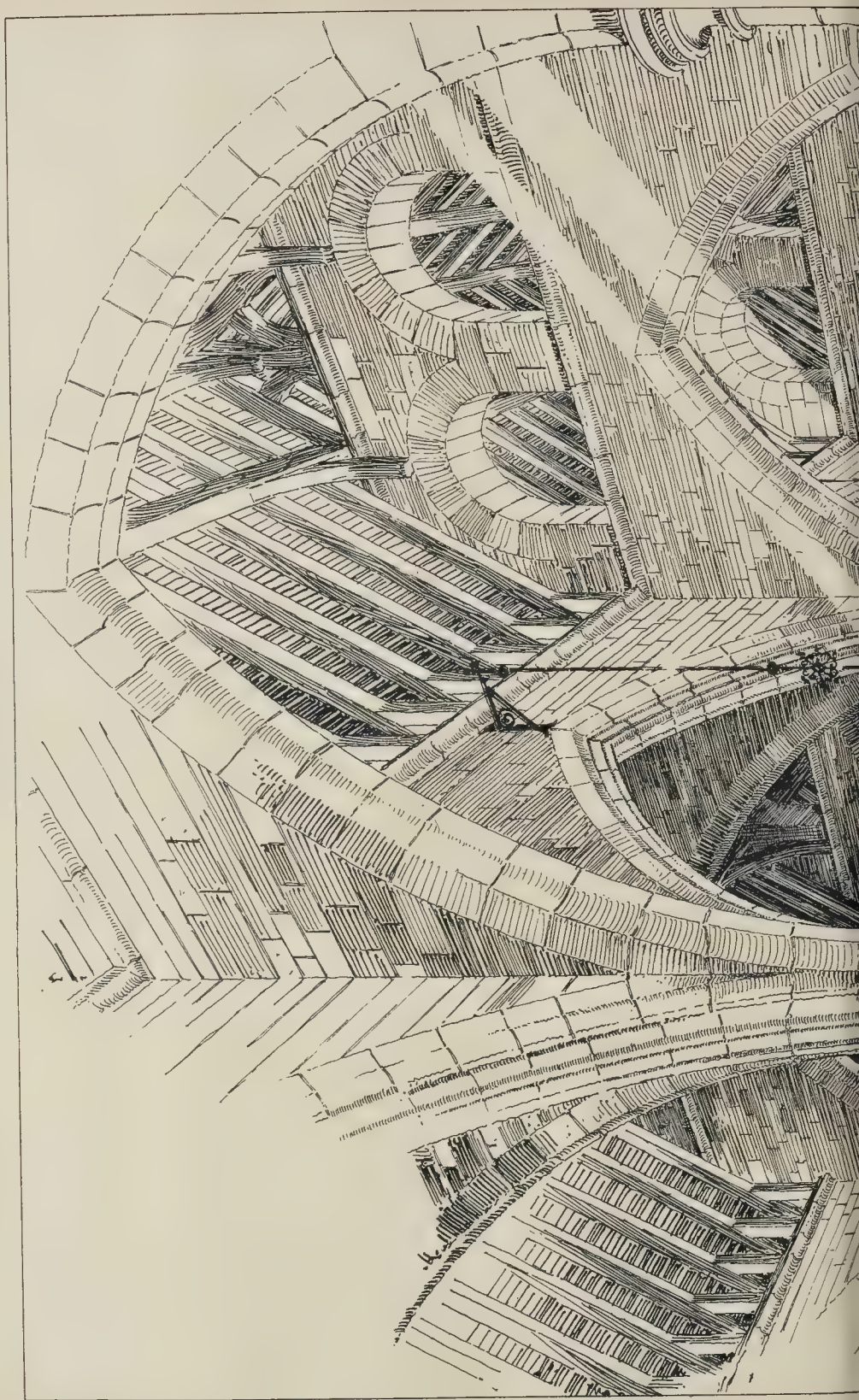
THIS drawing, which was exhibited at the Royal Academy of this year, gives a view of the new lodge and gates erected at the entrance to the grounds of Eaton Hall, the Duke of Westminster's Cheshire estate, from the designs of Mr. R. W. Edis. A plan is subjoined (page 453-)

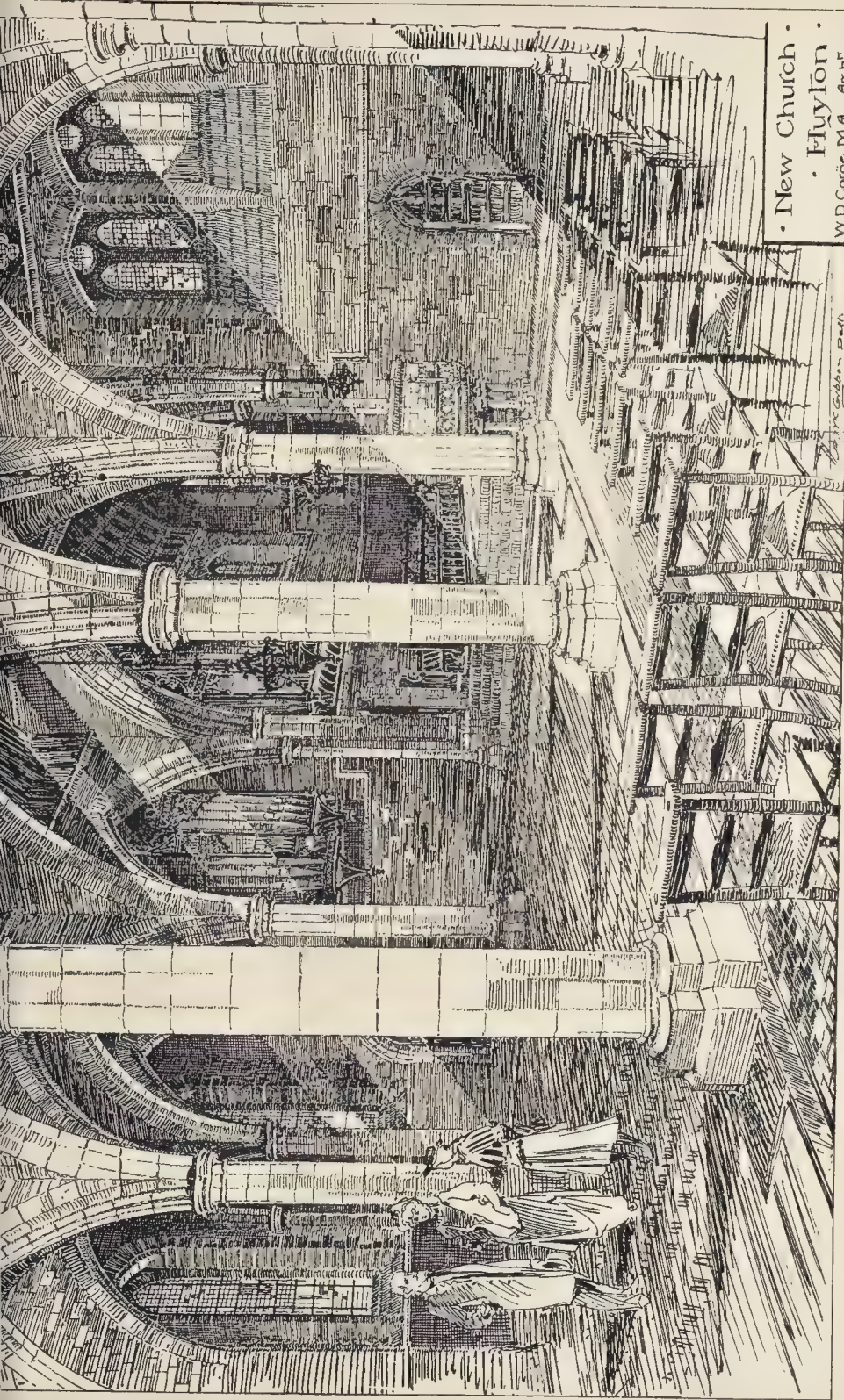
ENGINEERING SOCIETIES.

LIVERPOOL, ENGINEERING SOCIETY.—At the meeting of this Society on the 6th inst., Mr. F. M. Evanson, A.M.Inst.C.E., read a paper "On Water-saving machinery." The greatest improvement in this direction, he said, was the introduction by Lord Armstrong of the accumulator system, though it was a mistake to regard accumulators as any appreciable "reservoir" of power. They were merely "regulators" of the pressure. Passenger lifts, a very important branch of hydraulic engineering, might be divided into two main types, viz., direct-acting ram lifts and suspended lifts, the former being most generally adopted by engineers and architects. A most important step in the matter of water-saving was the introduction by Mr. E. B. Ellington of his patent hydraulic balance, since which many forms of hydraulic balances have been constructed by all the principal lift manufacturers; the main object of the balancing cylinder being to obviate the use of balance weights attached to the cage by either chains or ropes, also all overhead sheaves, and at the same time to reduce the quantity of water used to the smallest practical amount. In the case of direct-acting lifts working from the Hydraulic Power Company's mains, the chief advantage was the reduction of water used. Of these balances, the most recent type was that known as the "patent double hydraulic balance," introduced by Messrs. C. & A. Musker, Bootle, the principle of which was there were two rams, equal in aggregate area to the one in Ellington's type. To raise (say) two or three passengers, according to what is desired as the load for the "single" power, water is admitted to one ram only, whilst for any greater number of passengers water was admitted to both rams. This arrangement involved no complication of valve gear, as only one hand-rope was adopted, and in order to



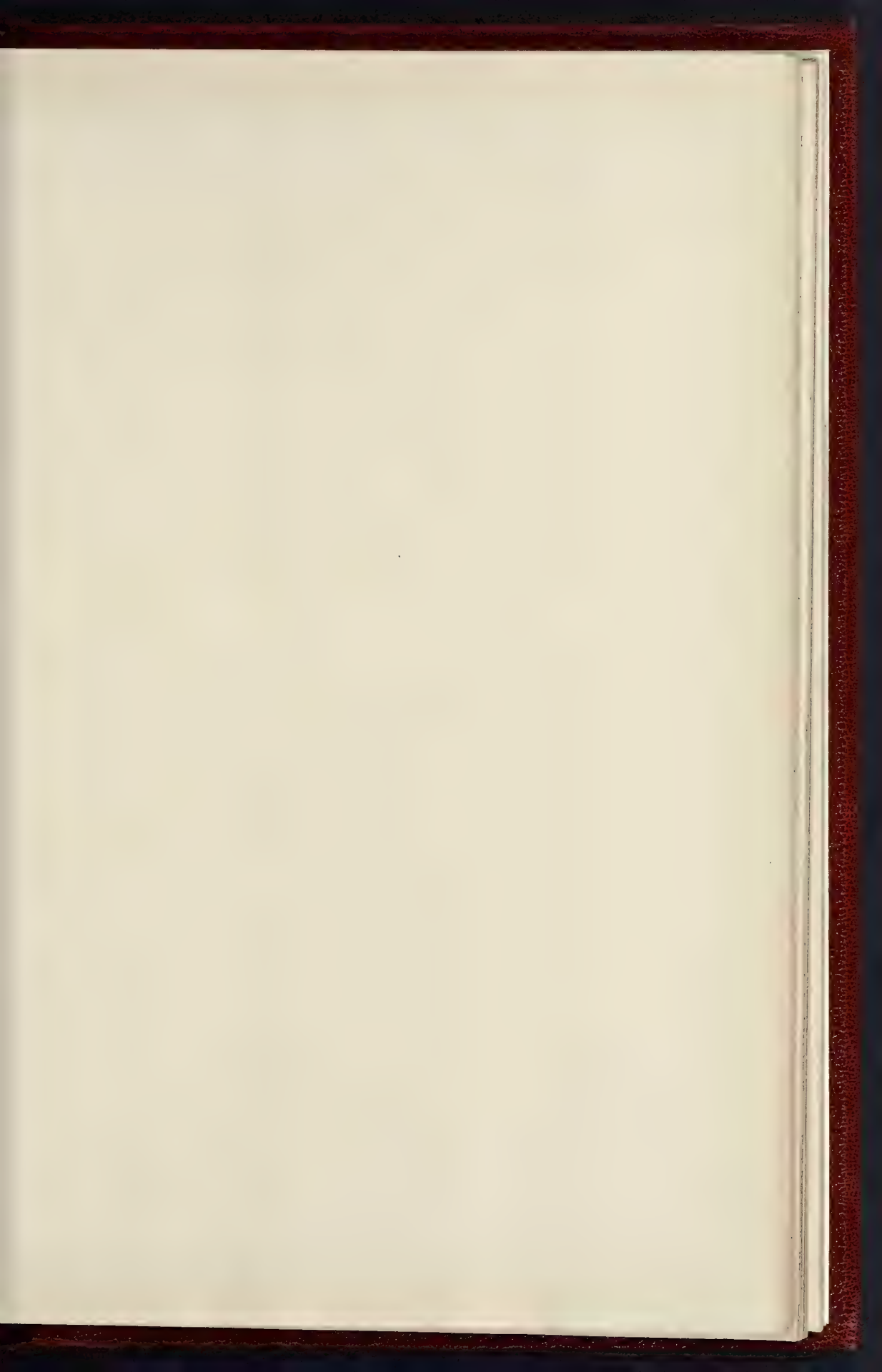
THE BUILDER, DECEMBER 16, 1893.

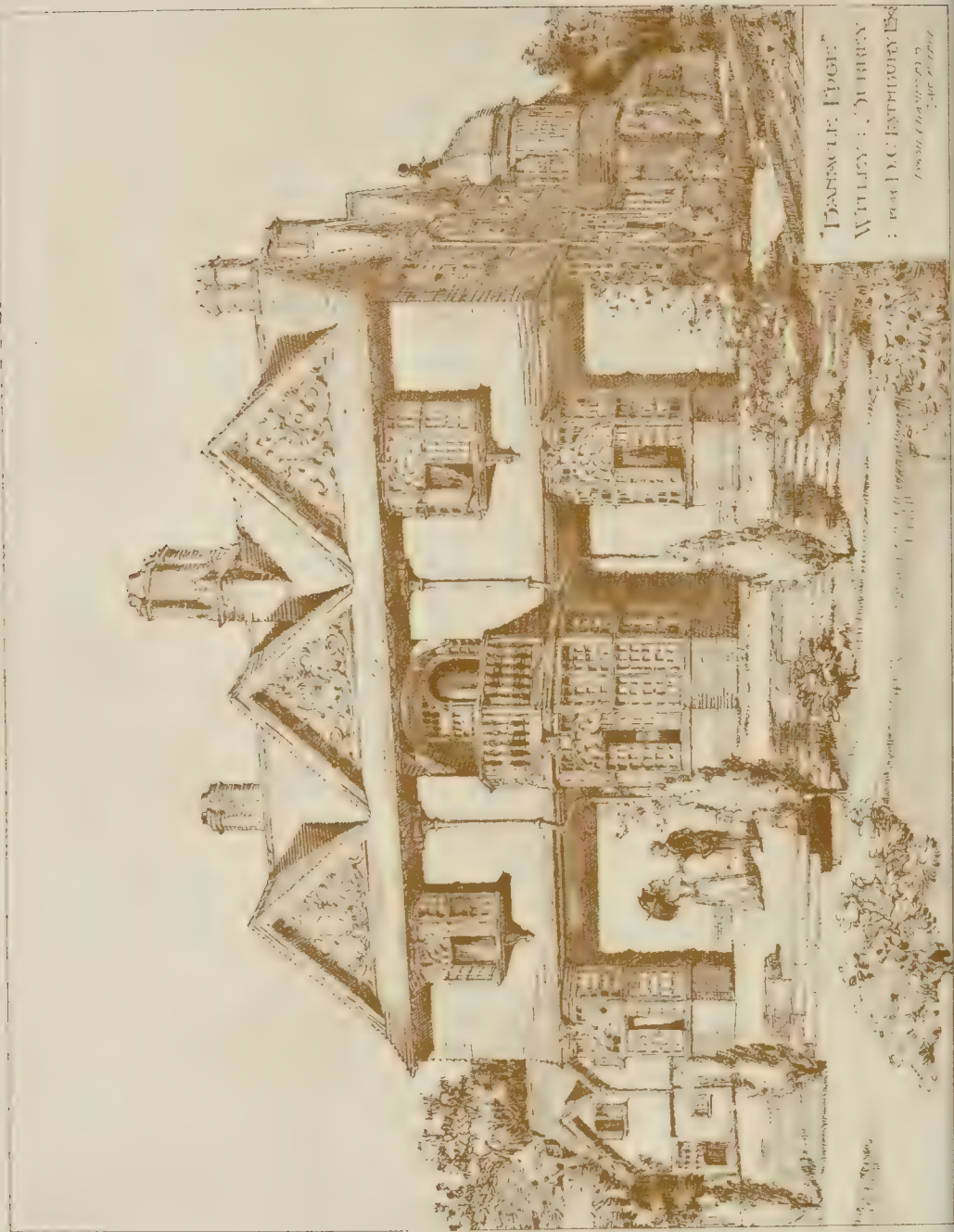




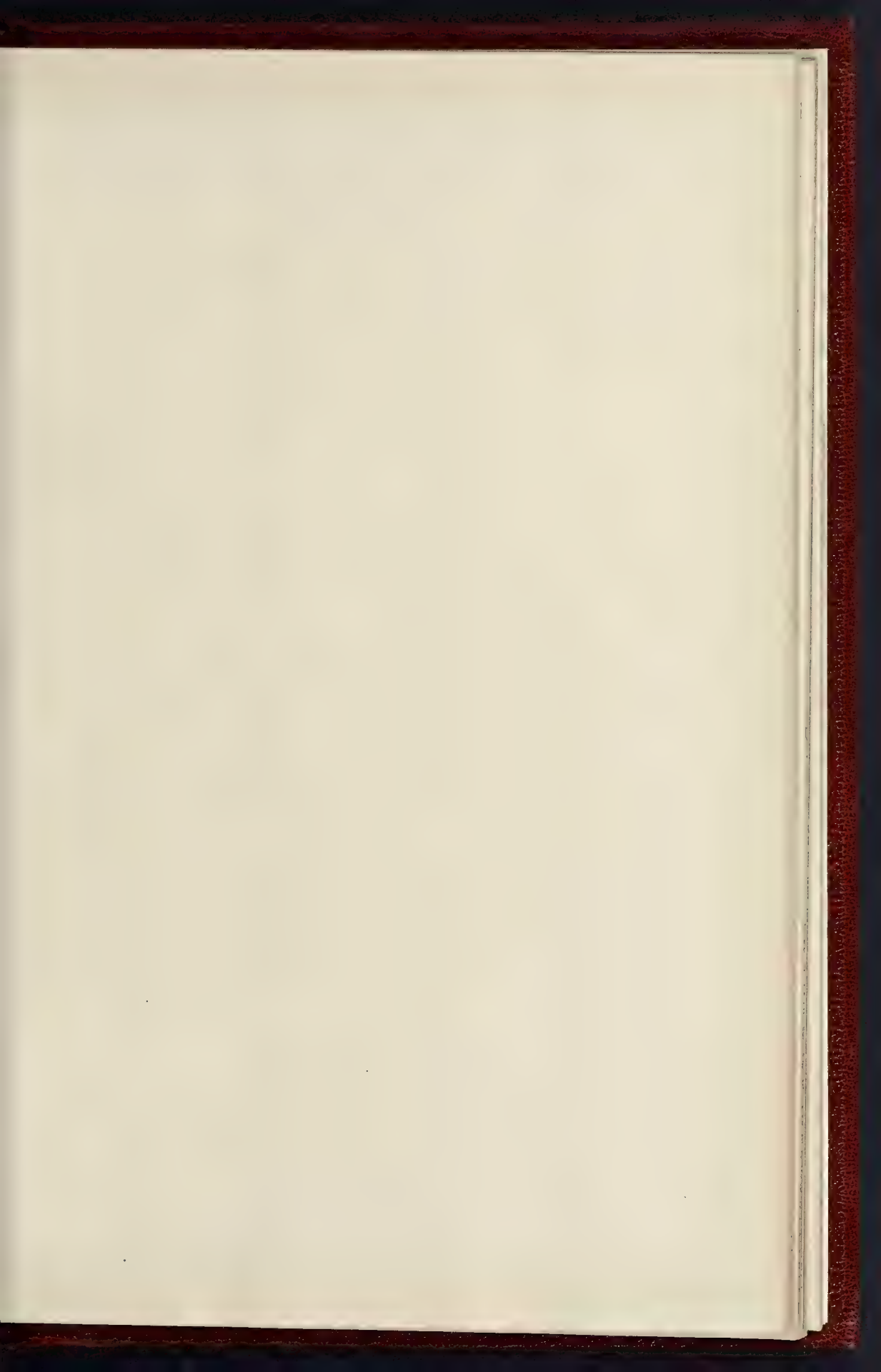
• New Church •
• Hylton •
W.D. Corde, MA. Archt.

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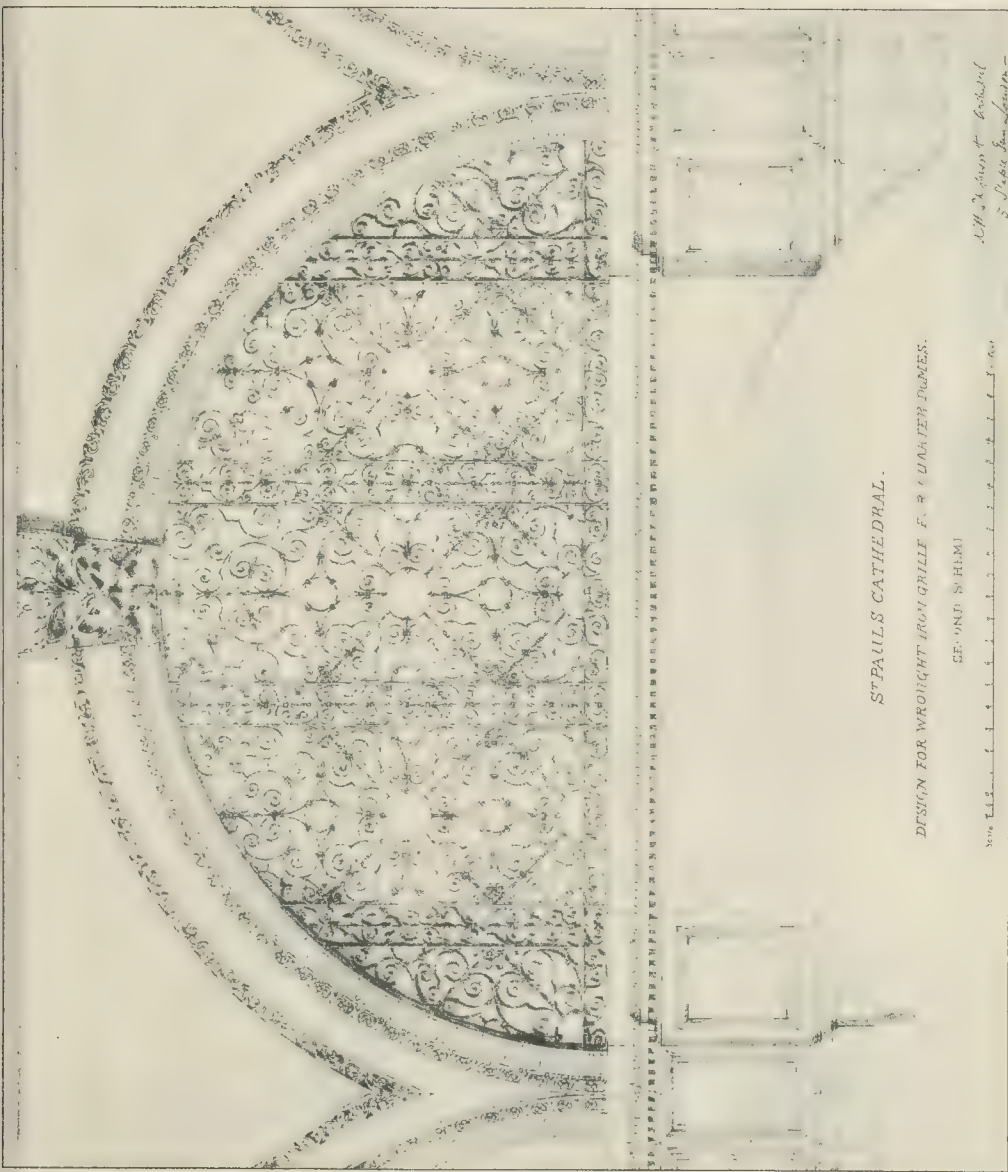


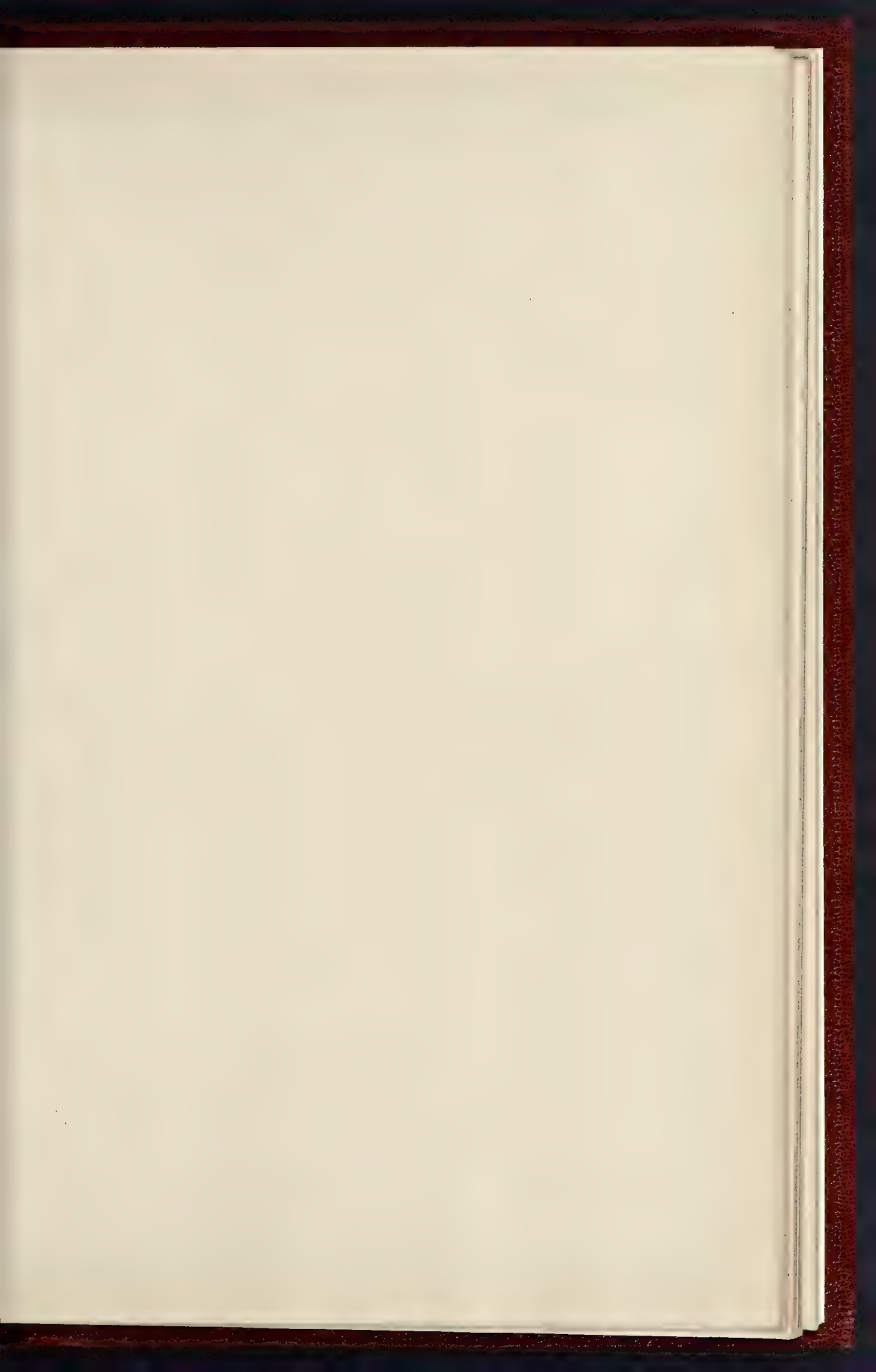
"DANSVILLE HOUSE"
WITLEY, W. CHURCH
DESIGNED BY J. C. LINTHROP, ESQ.
1893. (See page 2)





DESIGN FOR A FRIEZE.—By MR. PATON WILSON.







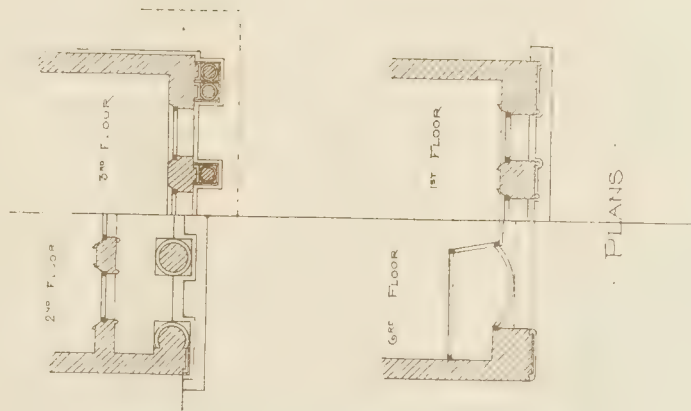
NEW ENTRANCE GATES AND LODGE EAST



Robt W Edis f.s.a.
Architect

PHOTO TWO HERALD JE & CO 46 S EIGHT HARDING STREET SEVEN LANE E.C.

PROPOSED · BUSINESS · PREMISES · EXETER ·



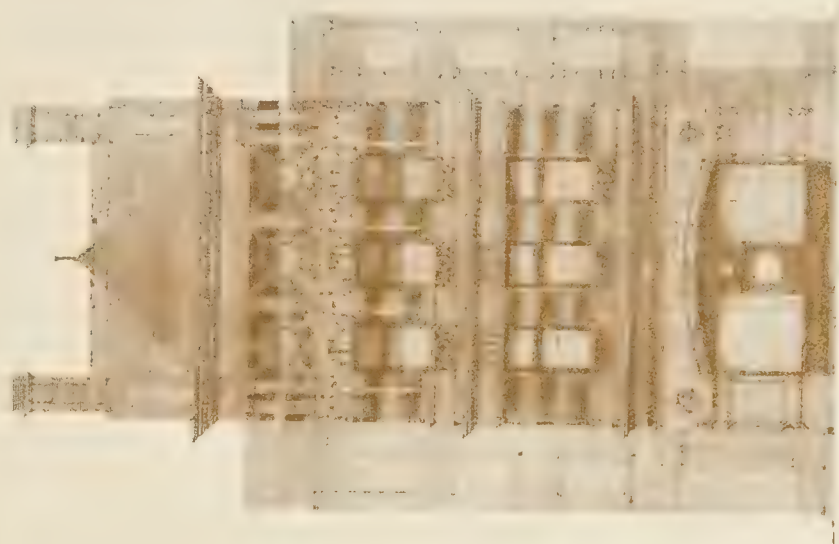
PLANS ·

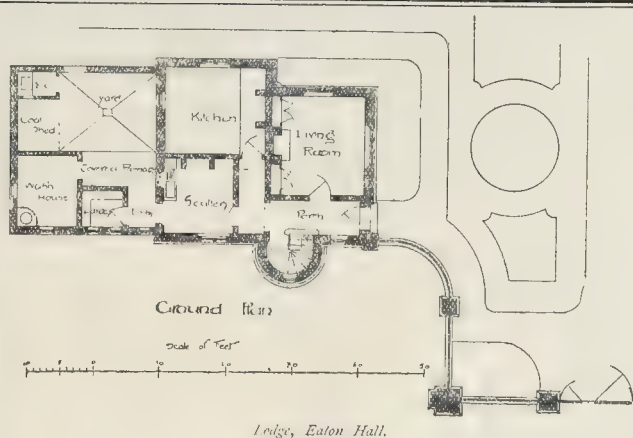
S. DUFFY & SONS, ARCHT.

ELEVATION

2nd Floor

3rd Floor





open the second port to admit the water to the second cylinder it was only necessary to pull the hand-rope another 18 in. or so further.

THE CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—The annual address of the President (Mr. Reginald Bolton) of this Society was delivered at the opening meeting of its session on the 14th inst., and was devoted to the subject of "The Literature of Engineering." After reference to the value of technical book study in connexion with, or in addition to, practical education, Mr. Bolton considered the difficulties that lay in the way of the technical student by reason of the vast amount of material at his disposal, and the absence of any standard catalogue of works, and of any system of cataloguing and indexing the same. A bibliography of applied science works, and glossaries of technical terms, were shown to be needs of the present day, and their publication under the authority of the learned societies was held to be the proper course. A system of guide-books to study, or condensed bibliographies, several of which were suggested to the respectively interested organisations, was advocated. The question of what not to read was gone into, and led to a consideration of periodic literature, and some of the systems followed in it were condemned. The question of opening and rendering accessible scientific libraries was dealt with, as was the need for greater liberality on the part of certain societies in purchasing books. The address closed with an outline of suggested reading for the young engineering student.

THE INSTITUTION OF CIVIL ENGINEERS.—At the ordinary meeting of the Institution of Civil Engineers on the 12th inst., Sir Benjamin Baker, K.C.M.G., Vice-President, in the chair, a paper was read dealing with "Cask-making Machinery," by Mr. Lewis H. Ransome, Assoc. M. Inst. C.E. The chief difficulties to be overcome in the application of machinery to the manufacture of barrels were stated to be, 1st, the different sizes and varying shapes of barrels; 2nd, the diversity of the materials employed; and, 3rd, the difficulty of working wood by machinery without undue waste.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The last meeting of this Association was held on the 6th inst., Mr. C. H. Compton in the chair. Mr. C. Brown reported the discovery of an inscribed Roman stone in the foundations of the ancient tower called Pemberton's Parlour, Chester, which latter fell down early in the year, and has since been rebuilt. By permission of the Marquis of Bute plans were exhibited of the excavated remains of the Black Friar's Priory, Cardiff, which have recently been entirely laid open to observation. The remains are within the Castle enclosure, at the western entrance to the town, and the entire ground plan has been recovered. Other extensive excavations within Cardiff Castle, carried out by the direction of the Marquis of Bute a few years ago, were also indicated on a plan of the Castle sent for exhibition. A long continuous wall of Roman date, with angular towers, has been met with on the

east side of the Castle enclosure, buried beneath earthen banks of later date, on which a Mediaeval wall had been erected. Excavations elsewhere indicate the existence of a similar return wall on the north side. Mr. Loftus Brock, F.S.A., exhibited a piece of fine black Roman ware, with patterns traced by hand, found in London. Mr. Earle Way described some remarkable Roman bracelets of bronze which have recently been found at Bankside, Southwark, with evidences of the existence of an extensive cemetery; other examples were of Kimmeridge jet. Mr. Davis exhibited an earthenware matrix of the arms of London, found at Hampstead. A paper was then read on the discovery of part of the Saxon Abbey Church at Peterborough, prepared by Mr. J. T. Irvine, and read in his absence by Mr. Loftus Brock. The discovery was made after the demolition of the central tower, when certain foundations, evidently of early date, were met with, cut into by those of the existing Norman church. The piers of the tower recently removed were found only to stand upon the plaster floor of the Saxon buildings, without any more solid base. The ancient walling was traced as far as possible, and the outlines of two transepts and of a square presbytery have been determined. These are exactly parallel to the existing Norman walls, but the axis is more to the south than that of the present church. The discoveries were shown on a large plan. Some of the Saxon stonework bears evidence of its previous use in some more ancient building. A paper was then read on the excavation of the Stadium on the Palatine Hill, Rome, prepared by Dr. Russell Forbes. The works undertaken in celebration of the silver wedding of the King and Queen of Italy are now brought to a close, and the enormous building can now be inspected. The walls were partially lined with marble and partly coloured. The ranges of arches, the galleries, and the other architectural features were described in detail.

SOCIETY OF ANTIQUARIES OF SCOTLAND.—The first monthly meeting of the Society of Antiquaries of Scotland for the session was held in the Society's Library, Queen-street, Edinburgh, on the 11th inst., Mr. Balfour Paul, Lyon King of Arms, in the chair. The first paper read was an account of the prehistoric fortified towns of Eildon, Roxburghshire, and Treceiri, Carnarvonshire, by Dr. D. Christison, Secretary. In the second paper, Mr. J. M. Gray, of the Scottish National Portrait Gallery, gave some additional notes on the heraldic glass at Stobhall and in the Magdalen Chapel, Cowgate. He said the stained glass in St. Magdalen's Chapel in the Cowgate had been recently released, and placed in a state of thorough repair. The tomb of Janet Rhind, widow of the founder of the chapel, had also been protected. These measures for the protection and preservation of the window and tomb had been accomplished through the aid of six Fellows of the Society, with the co-operation of the Scottish Reformation Society, who own the chapel. In the third paper, Mr. John N. Macleod, of Saddell, discussed the question of the identification of the site of Delgon or Kindelgen, the seat of Conall, King of Dalriada, in the middle of the sixth century.

Correspondence.

To the Editor of THE BUILDER.

DECORATIVE ART AND THE ROYAL ACADEMY.

SIR,—I have just read your short notice of Mr. Richmond's lecture at the "Arts and Crafts" Exhibition—a lecture which was, I believe, made unusually interesting to the audience, not only by the illustrations, but by the fresh and intelligent explanations—the personality, indeed, of the lecturer.

But it certainly has struck me as a remarkable instance of the "innocency," if one may say so, of English painters, even of distinguished ability, with regard to all that side of their art which is outside the usual gilt frame, that here is a man, worthy an Associate of the Royal Academy, who only after being entrusted with a decorative work of the very highest importance, discovers, as if quite previously unknown facts, a whole series of perfectly well-known and much-written-about phenomena, familiar to every decorative colourist, and mentioned by most writers on decorative colour. I think, perhaps, the most recent explanations of the effects of outlines, or superimposed lines, of colour in altering the apparent tones of the ground-colours with which they are in contact, are in the admirable little book on colour which was published, about 1887, by Professor Church, of the Royal Academy; a book quite the most excellent of its kind. I know that I have myself laid stress on these very facts (not as discoveries) in every lecture I have ever given to students on architectural colouring; and that I prepared, at least as long ago as 1874, a whole series of illustrations of those effects for lectures, one of which I find in the *Builder* for that year.

It is, to me, quite amazing that no attempt should be made, in the teaching of our young painters, to impart some knowledge of these, and such as these, phenomena of colour, which are, so to speak, the very backbone of the art of colouring applied to architecture. Even Royal Academicians cannot always go on ignoring that side of their art which, after all, is the one in which the greatest men have found the noblest field.

J. D. CRACE.

LABOUR & BRITISH WORKMAN.

SIR,—At the excellent and interesting discussion at the Architectural Association on Friday evening two most important phases of the subject were very inadequately treated—namely, the question of "levelling up," and that of "drink." The labour representative, on behalf of the workmen, assured us that all of the better sort were desirous of proper education, perfection of workmanship, a proper day's work for a proper day's pay, and the general advancement of those who join the Union. And, as far as profession goes, nothing could be more satisfactory and encouraging. But when we come to the policy pursued by their organisations it is exceedingly difficult—nay, impossible—to reconcile the one with the other. The men deceive themselves and each other into believing this to be really the case. Men, if of sufficient respectability, are attracted, coerced when possible, to join a trades' union absolutely without any proper test, or trade qualification, under the assurance that they shall not receive less wages than their more competent or more industrious neighbours. Under the name of brotherhood and good fellowship, young men who have not learnt their business, and older men who have, are dragged in, whilst the best men are denied the opportunity of making the best of their own abilities and attainments. The inevitable tendency is to reduce all men to a meagre mediocrity. It is the interest neither of the competent nor of the incompetent workman to advance; and many of the best men who will not be kept down are practically driven out of the trade, to become supervisors in some capacity or other. It is not, surely, to the true interests of good brotherhood that a man with superior capacities should be debased or discouraged from advancing himself as best he can by means of his natural endowments. And is it to be hoped that board school education will enable the rising generation to look at this in a different light? Can the industrial schools and colleges so revolutionise the present state of things as to lead to a reversion of a base and degrading policy, whilst only 1 in 150 of working men are taking advantage of the opportunities afforded them? Then, indeed, trades unions might look forward to enjoying

the confidence of employers and the public generally; and the good work prophesied for the future might have some hope of fulfilment.

A similar evidence of good brotherhood is professed in a practice which is often, if not generally, followed; but which demonstrates its absolute falsity. The men on a job agree together to have so much beer served round daily at certain periods. This is all very well, though I may question the individual benefit to any. But then all are made to pay their share of the beer, whether they drink it or not; and some are found with the moral courage to decline it, leaving to others the benefit (?) of their share. Is it possible that sensible men should not see the immorality and the cruelty of such a course? It is now well known that alcohol acts as an actual deterrent to labour. The permission of this practice does not indicate much progress in "levelling up," whatever may be the desires or the professions of those who constitute themselves leaders of their policy and action. For all waste, of whatsoever description (even the lost labour and deprivation caused by strikes), is a serious loss and injury to the whole community.

WILLIAM WHITE, F.S.A.

301, Wimpole-st.

"AMERICAN ROOFING SLATES IN IRELAND."

SIR,—I must notice a reference in the *Builder* to a "recent report of a Consular Agent" advertising the use of American Sea-green Slates in Ireland. That humbug, allowed to fall into oblivion for twenty years or more, should be exploded.

About 1870 lots of American sea-green slates came into this country unfortunately. Owing to the vagaries of Welsh slaty-winners in that year sixty miles across the Channel they were, *pro tem.*, comparatively cheap.

Mr. Street, with characteristic inconsistency and obstinacy, must have American slates in his restoration of Christchurch, Dublin. They are as bad slates as I have had the experience to know in Ireland. They grow bad-coloured, brittle, and early in Irish climate. They are a perpetual nuisance and annual expense in renewals and repairs on the cathedral and synod-house. This new importation of Pennsylvania slates, "free from pyrites and of extraordinary toughness," will want a twenty years' character before any one here would look at them.

THOMAS DREW, F.R.I.B.A.

Christchurch, Dublin.

VANDALISM AND THE LONDON SCHOOL BOARD.

SIR,—Will you allow me, in the hope that publicity may obviate similar action in future, to call the attention of your readers to the unfortunate and unnecessary act of Vandalism now being perpetrated by the London School Board in the demolition of what is known as "The Old Palace," Bromley, near the Church of Stratford-at-Bow?

This historic building, date 1600, apart from the associations connected with it, contains within some twenty paneled rooms of various periods, and examples of some of the most beautiful Elizabethan carving and plaster work in England, the design of the latter being as refined and the execution as perfect as any at Hardwicke, Haddon, or Hatfield.

There appears no reason why the old house, which is in admirable preservation, should not have been adapted or at least incorporated into the new building which the School Board are proposing to erect. The instructions of the Code as to buildings will probably be pleaded against this, but a little care on the part of the officials of the Board, and a little "enlightened Conservatism" instead of the present doctrinaire ignorance and wastefulness might have prevented the replacement of a beautiful building by the regulation Board school.

Instead of this we are using the ratepayers' money for the destruction of work, the mere commercial value of which, when removed, may be estimated in hundreds of pounds, to the great benefit of the Wardour-street harpies, who will reap their 500 per cent. on the deal.

But there is another aspect to the case which will appear to many to be more serious still.

The educational value of a great Elizabethan landmark, with its historic associations, would have been incalculable on the minds of the children, and the neglect of this by a public body like the London School Board appears unpardonable.

C. R. ASHBEER.

Essex House, Dover.

ORIENTATION IN ARCHITECTURE.

SIR,—As one who is neither architect nor astronomer, but merely an interested outsider, may I be allowed to make a few remarks and inquiries upon this interesting and far-reaching subject, suggested by your leading article of last week? I have seen Mr. Penrose's suggestive essay, and I followed with interest the correspondence on the orientation of churches which was carried on in these columns in the earlier part of this year.

1. As regards Mr. Penrose's position. Stellar orientation is one thing, solar another. Mr. Penrose combines them, and on this ground alone, that "as obviously the priests would desire to have due warning of the sun's approach, it was arranged that some bright star should rise or set, &c., &c.," and he calls the star in each case a "time-warning star." That is, Mr. Penrose makes the star subservient to the sun, so that at this rate the building was set out primarily towards the sun, not the star. But was the star needed at all? Is it "obvious" that the priests would require to observe a particular star to know when night was passing and day approaching? I cannot, for my part, believe that the star was wanted for that.

2. As I understand Mr. Penrose's argument, he distinctly starts with solar orientation, and only proceeds to investigate for a corresponding star on the strength of his above-mentioned hypothesis that a star would have been desirable as a "time-warmer." He then has first to consider what dates archaeology will allow him to deal with (although his whole object is to fix a date by means of the orientation, so that this is certainly very like arguing in a circle), and next to investigate whether within those dates any bright star was in or close to the sun's path, and so situated as either to rise in the eastward line of the temple an hour or two before the sun, or to set in the westward line about the same time. Mr. Penrose claims that in every one of twenty-eight temples which he has examined such a star is to be found, and points out that in view of the limitations imposed by the above conditions, it is in the highest degree improbable that in all these cases a bright star should be found, in the right position at a possible date, merely by accident. But he goes back a long way for some of his dates, as, to mention one or two, 1275 B.C. for the Temple of Osiris, and 1530 for the archaic temple on the Acropolis. Also his "bright stars" are not all of the first magnitude, e.g., α Arietis, γ Pegasi, ζ Aquarii. If time-warning stars were really required, surely conspicuous stars would have been chosen. If, on the other hand, the stars themselves were the real objects of the orientation, it is difficult to conjecture what could have been the significance of such a dim and inconspicuous star as ζ Aquarii.

3. What was the arrangement of Greek temples in the matter of doorways? Was there commonly a door at each end? Mr. Penrose often calculates his dates by a star which was to be observed from the adytum setting an hour or so before the sun would be rising. This he does with the temple at Egina, where the remarkable eccentric western doorway is one of the most important pieces of evidence in support of his hypothesis. But a door at the west as well as at the east end must have abolished most of the gloom and mystery of the sanctuary.

4. The little temple at Bassae was set out due north and south; is it then reasonable to talk of its being "oriented" at all? And if there was an eastern doorway specially opened for the admission of the morning sunbeams, why was the building not set out east and west to start with? Is not this rather suggestive of an orientation-at-any-cost theory?

5. Is the opinion of Fergusson and others as to the irregular disposition of the Greek buildings, as on the Acropolis, to be considered as of date—the theory, that is, that they were placed irregularly to secure picturesque effect and to accentuate the independent value of each building?

6. Is it known with what object the Egyptians set out their temples, or some of them, towards certain rising stars, as it certainly appears they did? Was the "Bull's Thigh" a sacred constellation, or had they a merely practical object, to make the temple a sort of observatory for the observation of the re-appearance of a star (after its annual conjunction with the sun) in order to mark off as it were a certain important date in the natural year? We are told, I believe, that the re-appearance (heliacal rising) of Sirius was coincident with the beginning of the Nile flood.

7. The direction of sacred buildings towards the east seems to be a world-wide practice. Nor does it appear surprising. They must be set out in some direction, and what point more proper than the east, the most important, so to say, of the four quarters of the horizon—certainly the most inspiring. But we know that sun-worship is widespread among primitive religious forms, and that, in this particular of orientation, traces of it are to be found in modern Christianity. The general rule now is that the eastern end of Christian churches is closed, but I have read that prior to the fifth century the rule was that the altar was at the west end, the priest standing behind it, facing at once the altar and the congregation, but that about the above

mentioned period the ends of the church were transposed (the altar end and the entrance end), so that the officiating priest, retaining his eastward position, had now his back turned towards the congregation. Is anything definite known about the history of this particular point in our church ritual and planning?

Many other interesting queries and points for investigation suggest themselves in connexion with this obscure subject of orientation, but I have already trespassed enough upon your space, and shall be well satisfied if some of your archaeological readers will be kind enough to throw light upon some of the points I have mentioned.

ENQUIRER.

CONDENSATION GUTTERS.

SIR,—In reply to "Drippy," condensation on glass results from the contact of the vapour in an artificially heated building with glass which has been sufficiently cooled by the lower temperature of the outer air.

This condensation is liable to take place on all parts of the glass.

When it happens from any cause to come in contact with the glazing, it is apt to trickle perpendicularly down the outer side of this bar, and so reaching the bottom edge the effect is to fall by gravitation to the ground (or on any plant which intercepts it). Were a properly arranged drip-groove there it would catch such water and carry it down its channel to the eaves' gutter. But besides this, the condensation water formed on other parts of the glass runs down until it comes in contact with the overlapped edge of the square below. Here the water globules are likely to be retarded and to run along the edge of the glass until they also come into contact with the bar, when they would drop as above described were no drip groove there. The contact of one globule with another also often diverts their course.

For the above reasons I think "Drippy" will see that condensation gutters are of very practical usefulness, and, indeed, essential if drip is to be avoided. At the same time it is quite true that good glass is also essential. Where glass has irregularities on its surface they check the condensed moisture, which is liable to drip from them directly. Evidently condensation gutters would not prevent this. But this inferior glass should never be used.

WM. PARHAM.

Northgate Works, Bath.

The Student's Column.

GEOLOGY.—XXV.

ROADS.

THE influence of geology in determining the nature and cost of maintenance of roads must be manifest to every road surveyor. As the physical features of a district are to a large extent due to its geology, the action of the weather on the rocks producing characteristic slopes, it follows that the gradients of roads, and, to some extent, locally, their direction also, are almost entirely governed by geological considerations. To a certain extent, it is true, improved methods of road-making have had their influence in overcoming Nature where she is unkind. The engineer has modified natural gradients by making cuttings and embankments. The surveyor has so constructed the surface of roads and maintains them in such excellent order that they have no chance of relapsing altogether into their pristine condition. But, in spite of these alterations, geology yet exerts considerable influence on them.

Let us quote one of numerous examples that might be given in proof of this. Mr. F. J. Bennett, of the Geological Survey, states that some years ago a friend of his went on a bicycle tour from Norfolk into Derbyshire and back, and, on learning the route taken, Mr. Bennett rather surprised him by drawing up in tabular form an accurate estimate of the gradients, road material, general condition and average riding state of the roads on each of the several formations which he met during the journey. This was done by consulting a general geological map of England, but it of course required some considerable knowledge of the science also.

It is a well-known fact that where a thick stone coating is not used on the surfaces of roads, their condition will vary with the subsoil, especially where, as in many country districts, the metal is very thinly laid on, and the incorporation of the stone with the underlying ground is left to local traffic, and not properly rolled in. For example, in a case where a road passes over a clay and sand subsoil, and is metalled with one description of stone, it will be found that during wet weather the clayey sand portion will be much softer than that part on the sandy subsoil, and an

dry weather the portion on the former will keep firm much longer than that on the latter.

Mr. Bennett, in the memoir previously alluded to, remarks that roads running over oolite are, as a rule, very bad—in fact, they are the worst roads known, especially if metalled with the same rock. Such ways are slippery and muddy in wet weather, and dry into ruts under the action of the sun, wind, and frost; whilst in very dry weather they become extremely dusty. The gradients are usually long, and but slightly inclined, except at a scarp. The same may be said with reference to roads on the Chalk formation in regard to gradients, but where well metalled with flint and passing over an open country, they soon become dry after a shower, and keep firm a long time in fine weather. Roads on Carboniferous Limestone as a rule have very long and very steep gradients, and unless well metalled become muddy and greasy; or, on the other hand, dusty. Roads on the Bagshot Sand, or similar formations, are usually dry, even in fairly wet weather, unless the sand contains much clay; in times of drought, however, they are liable to become dusty. Roads on strong clay land, unless well metalled, occasionally develop more or less extensive cracks after a spell of dry weather, and small subsoil slips may take place on them after heavy rains, especially where the gradient is rather steep, as in some London Clay districts. In certain parts of the country, the lanes are roads are much deeper than would otherwise be the case, from the circumstance that during wet weather they are more or less converted into river courses, and have thus been excavated by the erosion due to flowing water. It is next to impossible to keep such ways in good repair, except through the medium of effective drainage. We often find long stretches of roads on hard rock of such a durable nature that the District Surveyor is content to leave them alone; such a policy is very short-sighted, as in time the surface becomes rough and undulating, when it is difficult to repair.

The question is sometimes asked—What are the essential characters of a good road metal? The answer is not difficult to give; it should be hard, tough, and of durable mineral composition. The vast majority of road metals used in this country, except, perhaps, in large towns, have none of these attributes, and are generally of the worst possible description. As might be surmised from what we have already said, the principal road metal in country districts is that found in the immediate vicinity of the roads. The average Local Board prefers, when possible, to obtain the material, no matter how unsuitable it may be, from within its own jurisdiction. Thus, we could point out enormous tracts of country where the metal employed is an earthy description of limestone raised from the Lias or one of the oolites. In a certain part of Wiltshire the other day we noted that a rough Jurassic limestone was carted at least *six miles* from a stone pit to be laid on a high road; its character was such that it is sure to become utterly rotten in the course of a year. On inquiry, we elicited the fact that the majority of the roads in the vicinity were mended with the same material. It is not that District Surveyors, as a body, are unaware of the worthlessness of such "metal"; it is that in too many instances it is cheap; whilst a sentimental feeling sometimes prevails that the local stone trade ought to be encouraged, and occasionally vested interests may have some influence in the choice of material.

We venture to point out, however, that in the long run, such road metal as that just alluded to is not cheap—in fact it is very much the reverse. Roads that are strongly and well made in the first instance last for hundreds of years, and require but little attention. Contrast the old Roman ways with those made at the present day. The late Sir W. V. Gulse described the condition of that part of the Roman military road from Gloucester to Caerleon, between Soudley and Blackpool Bridge, in the Forest of Dean (the *Via Julia*). Where it remains perfect, he says, it consists of roughly-squared blocks of conglomerate, or of Millstone Grit, of 10 in. to a foot cube each, with a well-set line of marginal stones, about 15 in. long by 5 in. wide, and 10 in. deep. "The strength of the work is such that after the lapse of all these centuries, but for the use that has been made of it as a quarry for roads, fences, and buildings, it would have been in good order still." It is too much to expect that local authorities at the present day will construct such roads as this; but they should at any rate possess sufficient public spirit to insist that good and

durable macadam only should be employed. We know of a case where a tolerably crystalline limestone was used on a certain road, and the scavenging was such that a crop of 500 tons of mud per mile was produced proportionately against 60 tons of mud per mile when it was subsequently replaced by a better class of metal. Comment is needless.

We have said that a good road metal should be both hard and tough. Some of our readers might imagine that where one of these properties is present in a stone, the other must of necessity follow; but this is by no means the case. Many of the hardest stones in existence are very brittle, so that great care must be taken to distinguish the difference between the hardness of a stone and its toughness. Again, the same kind of material varies in respect of both these qualities. Flint, for example, is a very hard stone, but when freshly quarried is extremely brittle; after a time, however, it begins to lose this detrimental character, when it is difficult to find a much better metal for the average country road. In certain districts Chalk flints are full of little cracks, which render them comparatively useless.

The specific gravity of stones is frequently quoted in matters relating to road metalting; but we submit that it is of no real use in this connection. For instance, igneous rock, containing a large proportion of silica, would, *ceteris paribus*, be of less specific gravity than another in which magnetite, or some other form of iron, was present in considerable quantity. The former may be a compact rock, and the other comparatively loose. No one should have any doubt as to the respective qualities of the two materials as road metals. Some quartzites (rocks made almost entirely of crystalline silica) are very suitable; but they are often rather brittle.

"Resistance to crushing" is sometimes referred to as a criterion in selecting road metal; but we do not think the actual facts sufficiently support this view. The steady pressure of machinery on a plane surface, as in experiments on crushing, must not be compared with that uncertain, uneven, grinding action to which road metal is subjected.

That road metal should be composed of durable minerals goes without saying; and these should be so disposed with reference to each other that a species of binding or interlocking is set up. Materials on roads are often subjected to very severe chemical tests. On some country roads, the stones after a rain might be described as being literally in a chemical solution of great strength, which is trying its best to disintegrate them.

If we had to select classes of stone specially suitable for macadam on roads of great traffic, our choice would unhesitatingly fall upon the finer-grained hornblende granites and syenites. They seem to answer to all the primary qualifications of good metal, and have been well tried for many years in the most exposed situations. We do not say that these are the only kinds of rock best suited to the purpose—indeed, we have already mentioned a few others—but they seem, as a whole, to be uniformly good. We must caution the student in this connexion to be certain that he is actually dealing with hornblende granites and syenites, not merely with rocks bearing these names for commercial purposes, and which sometimes are totally different classes of materials. We have previously described the essential features of the two igneous rocks mentioned, and there is no necessity to repeat them. An instance has recently come under our notice where a crystalline limestone of the Carboniferous formation is sent extensively to the market as "granite." This is a flagrant case that ought to be widely known. We are aware that for years a similar rock has been exploited as "granite" in Belgium, but were not altogether prepared to find it quarried also in England. Crystalline Carboniferous Limestone is a good road metal enough in its way, but it is entirely different in chemical composition, structure, durability, and otherwise to granite. The only points of similarity are that both are hard and crystalline—the very characters that are apt to be misunderstood by the road surveyor.

THEATRE OF VARIETIES, SHOREDITCH.—A company, under the name of the "London Music Hall Company, Limited," is about to be formed for purchasing the London Theatre of Varieties, Nos. 55 and 57, 111th Street, Shoreditch. The present building has a frontage of 70 ft., an area of 8,000 ft. superficial, and a capacity of 1,330 seats. The freehold, goodwill, and licences are valued by Messrs. J. T. Wimpens & Arber, architects, at 80,000 l., which is the purchase price fixed by the vendors.

OBITUARY.

MR. ALEXANDER LESLIE.—The death is announced of Mr. Alexander Leslie of the firm of Messrs. J. & A. Leslie & Reid, C.E., Edinburgh. Deceased, who was the son of the late Mr. James Leslie, engineer, was educated at the Edinburgh Academy and University. He became a partner in his father's business in 1870, and since that time has taken part in most of the undertakings in which the firm has been concerned. After Mr. James Leslie's death in 1889 the firm was continued as engineers for the Edinburgh and District Water Trust, and the Water of Leith Purification and Sewerage Commission, and they have been consulting engineers in most new water supply schemes introduced by Scottish Corporations of recent years. During the past year Mr. Alexander Leslie held the position of President of the Royal Scottish Society of Arts.

GENERAL BUILDING NEWS.

CHURCH OF ST. ANDREW'S, PAIGNTON, DEVONSHIRE.—The church of St. Andrew in Sands-road, Paignton, was opened, and dedicated as to its chancel and gifts a few days ago. The new church is only completed so far as the chancel and eastern end, which has been built by Mr. E. P. Bovey, of Torquay, from plans by Messrs. Fulford, Tait & Harvey, architects, Exeter, at a cost of about 3,000 l. The whole structure is designed to cost 8,000 l., and pending the raising of the necessary funds for completion a temporary wooden nave has been erected by Messrs. Drew, of Paignton. The finished eastern end comprises the sanctuary, choir, morning chapel, organ chamber, and clergy and choir vestries. The style is based upon the French fourteenth-century period. The choir is executed in local red rock, with box ground stone dressings externally, and Hamhill stone dressings internally. The flooring of the chapel and vestries is of oak blocks, and that of the chancel is marble mosaic, while the steps and sanctuary are of Devonshire marbles. Behind the altar space is allowed for the erection of a reredos. The roof over the chancel and morning chapel is of oak, while that portion of the latter which is situated in the tower is covered by groined stone vaulting. The metal work in the church has been executed by Messrs. Singer, of Frome. A bell which has been placed in the belfry chamber was cast by Messrs. Taylor, of Loughborough.

PAIGTON, N. A. FREE CHURCH AT PETERCULTER, N.B.—The Deacon's Court of this congregation have now selected one of the three plans prepared by Mr. Rust, jun., architect, Aberdeen, for the new free church to be erected in the village of Culter.

EXPANSION OF THE BLACKPOOL CONVENT.—A new wing is about to be added to the convent of the Holy Child Jesus, Layton Hill, Blackpool. Plans have been prepared by Mr. Councillor K. B. Mather, architect, for a new wing to be added at the south end of the convent. In the basement, provision will be made for thirteen music-rooms, as well as accommodation for a gymnasium. On the first floor a room some 78 ft. long by 31 ft. in width will be available for school purposes, whilst on the second floor will be a chapel, with sacristy and inner sacristy. The present chapel will be transformed into a sleeping dormitory, and other internal arrangements will be made.

THEATRE AND HOTEL, NORWICH. Mr. J. B. Pearce, F.R.I.B.A., of Norwich, has prepared designs for a theatre and hotel, which he, in conjunction with the Theatre Company, propose to erect in that city. The site, situated at the corner of Red Lion-street and Orford-hill, and between Thorpe and Victoria railway-stations, covers a superficial area of 20,860 ft., and is now occupied by some freehold property. Messrs. Baker & Sons, of Queen Victoria-street, land agents and valuers, have estimated that the buildings designed by Mr. Pearce, together with the freehold site, will be worth 90,000 l.

SCHOOLS, WARRINGTON.—Lord Cross recently laid the foundation-stone of the new schools which are being erected in Manchester-road, Warrington, and which are to be known as the Fairchild National Schools. The buildings are estimated to entail a cost of 6,000 l. The architect is Mr. W. Owen.

MILBURN EXCHANGE, CARLISLE.—According to the *Carlisle Advertiser*, the Milburn Exchange was completely destroyed by fire in November, 1892, and the new exchange which is to be built, and which will occupy the site of the old building on Pier-head, with frontages to Lime-street, Rake-street, and the Pier-head, is estimated to cost nearly 30,000 l. The basement will contain a large entrance-hall, on the left of which there is to be a coffee-room, 32 ft. by 40 ft. On the right of the entrance-hall there will be a grand staircase, leading to the billiard-room, 34 ft. by 21 ft., and also to the restaurant, which will be 30 ft. by 59 ft., and lighted by skylights on both sides. This part of the building is to be supported by iron columns. An outside entrance to the restaurant will be provided at the north-west portion of the building. The remainder of the space will be utilised for cellars, to be used in connexion with the shops, which will be erected on the ground-floor to face Butte-street. On this floor will be provided the main entrances, 6 ft. in width, leading to the grand

* "Proc. Cotteswold Nat. Field Club," vol. vi (1892-3), pp. 289, 287.

staircase. In the front of the building facing the Pier-head large offices will be partitioned off, the two in the centre being 18 ft. by 24 ft. and the two on either side 18 ft. by 17 ft. On the side facing the dock there will be two suites of offices, which, if necessary, can be converted into ten rooms by extending the hall. On the north side there will be accommodation for five offices. The first and second floors are arranged in a similar manner to the ground-floor, with the exception that offices will be provided instead of shops. There will also be a central corridor, 5 ft. wide, and in addition, on the second floor, well holes intended to give light to the corridor below. The third floor is to be principally devoted to kitchen purposes. The exterior of the building will be worked in red brick and terra-cotta, and Forest grey and red stone. The entrance steps will be of granite, the chimney stacks of red brick, and the roof will be covered with green slates. Mr. E. W. M. Corbett is the architect.

HALL, PRESBYTERIAN CHURCH, NEWCASTLE.—The foundation-stones of a new hall, in connexion with the John Knox Presbyterian Church in Elswick road, were laid recently. A hall is to be first erected, and when that is completed a new church will be built. The plans were prepared by Mr. W. Lister Newcombe, architect, Newcastle, and the contract was let to Mr. J. H. Mauchlan, Newcastle. The front of the building will be of polished stone. On the basement there will be a gymnasium 37 ft. by 17 ft. There will also be a storage-room and a chamber for heating apparatus. On the first floor, in the front part of the building there will be a hall, and a library, which will be 30 ft. by 18 ft. At the rear of this will be the hall, which, until the new church is completed, will answer the purposes of a place of worship. This hall will be 50 ft. by 40 ft., and will accommodate 400 persons. Above these rooms will be the caretaker's house and vestry. The cost of the hall is estimated at 2,300*l.*, whilst the whole of the work when completed will cost 7,500*l.*

THE RESTORATION OF ARBROTH TOWN CHURCH.—At a meeting of the Arbroath Presbytery, on the 5th inst., plans by Mr. Burnet, architect, Glasgow, for the rebuilding of the town church, destroyed by fire upwards of a year ago, were submitted by the town-clerk and approved of.

GASHOLDER, NEWCASTLE.—The new gasholder for the Redheugh Gas Works of the Newcastle and Gateshead Gas Company has just been completed. The holder has a capacity exceeding three millions cubic feet, and has been erected from the plans and specification of Mr. V. Wyatt, the Engineer, by the contractors, the Whessoe Foundry Company, of Darlington. The floating or storage portion of the gasholder weighs about 600 tons, and the guide framing, exterior to the holder, weighs about 400 tons. The gasholder is divided vertically into three sections which are telescoped together. The outer section is 180 ft. 2 in. in diameter by 43 ft. 9 in. in depth; the middle section is 177 ft. 4 in. in diameter by 42 ft. 9 in. deep; and the inner section is 174 ft. 4 in. by 42 ft. 9 in. deep. The latter has a domed crown with a rise of 11 ft. at the centre. When the three sections of the holder are telescoped and raised together, the total height is 136 ft. 9 in. from the tank coping to the top of the dome. The top curb to the inner or upper section of the holder, and which takes the compression strain of the crown, is formed of steel plates $\frac{1}{2}$ in. thick, curved to form a quadrant, into which are fitted the vertical stiffeners and gussets, and the plates are double covered at the butt joints, and riveted in four lines of rivets throughout. On the top of this curb are rivetted and fitted the sixteen pairs of guide carriages and rollers to control the movement of the holder. The other sections or lifts of the holder have a corresponding number of pairs of guides. The pair of carriages and rollers for each standard are arranged at right angles to each other. There are three rows of horizontal girders to the guide framing, corresponding to the three sections or lifts of the holder, of the single lattice type. The steel is of the Siemens Martin quality. The gasholder tank is 184 ft. in diameter by 44 ft. 3 in. in depth, is constructed of Portland cement, concrete, and brickwork. The contract for the tank was entrusted to and carried out by Messrs. Walter Scott & Co., contractors, of Newcastle-on-Tyne. The special ironwork built into the tank was supplied and fixed by the Whessoe Foundry Company, and the whole was carried out under the superintendence of Mr. Moodie and Mr. Gibb, the company's managers at Redheugh. The cost of the gasholder, with tank and connexions, will be nearly 30,000*l.*

RESTORATION OF GRETTON CHURCH, NORTHAMPTONSHIRE.—On the 5th inst. the Church of St. James, Gretton, was re-opened by the Bishop of Peterborough, after restoration. The building, which is chiefly of the Norman period, has been restored by Messrs. Talbot, Brown, & Fisher, architects, of Wellington; the builder being Mr. George Henson, also of Wellington. The total cost having been about 1,000*l.* The roofs of the nave and south transepts, which were much decayed, have been renewed in oak and re-leaded. The clearstory windows have been restored to their original design and re-glazed. The north wall of the nave, which was in the most dangerous state, has been rebuilt and strengthened, and a buttress has been built outside. The windows of the north aisle have also been restored and re-glazed, whilst in the south

transept new four-light windows have been placed and the interior restored, new oak seats of the same pattern as those in the other part of the church being provided. Several other parts of the church also require restoration—the chancel, which needs re-roofing, new choir stalls, and east window, whilst the tower requires attention, one of the pinnacles having already had to be removed to prevent it falling and causing damage.

ALTERATIONS AT THE TYNE THEATRE, NEWCASTLE.—The alterations at the Tyne Theatre, which have been in progress for some time past, have just been completed. The most important structural alteration has been made in the entrances. Every department of the theatre has now a clear entrance of its own. A new staircase has been built outside the theatre from Westgate to the gallery. This staircase has doors entering from it to the dress circle, the upper circle, and the gallery. It is constructed of stone, cement, and iron, and is only intended to be used as an exit. Precaution has been taken to prevent fire. Alarm-bells connected with the office of the fire brigade are placed on the stage and on every circle. The dressing-rooms and saloon have been warmed by hot water, and the electric light added to some parts of the house in addition to gas. The saloon and the boxes and pit entrances have been made by Mr. G. H. Moor, carpenter; the new staircase by Messrs. J. & W. Lowry, contractors; the sanitary arrangements and gas-fittings by Mansfield Gibson; the electric lighting by Messrs. R. J. Charlton & Co.; the hot-water apparatus by Messrs. Dinning & Cooke; the new iron balcony by Mr. Thomas Alder, of Gallowgate; and the painting has been done by Messrs. John Richardson & Co. The whole of the alterations have been executed in accordance with plans prepared by Messrs. Oliver & Leeson, architects, Newcastle, and carried out under their supervision.

CHANCEL, ST. ALBAN'S CHURCH, STREATHAM PARK.—The new chancel at St. Alban's Church, Streatham Park, was consecrated recently by the Bishop of Rochester. Seven years ago a portion of the church was erected at a cost of about 7,000*l.*, and the chancel now added will, with its vestries, cost over 2,000*l.* Messrs. Gregory & Co., of Clapham Junction, have executed the whole of the works. The architect is Mr. E. H. Martineau. The tower and spire extension at the west end, fence walls, gates, &c., require to be completed. **CLUB PREMISES, WOLVERHAMPTON.**—A working men's club is being erected in North-road, Wolverhampton. Messrs. C. Manton & Sons, of Wolverhampton, are the architects. On the first floor is the concert room, with elevated platform extending across the west end, near which is the retiring room. Lavatories and other requisites are provided. Immediately under the room is situated the smoke-room, and adjoining room is the stewards' room and bar. The lower or basement story consists of cellarage, boiler-room, &c. Messrs. Jones & Attwood, engineers, of Stourbridge, will supply the heating apparatus. Messrs. Butler Brothers, of Wolverhampton, are the contractors.

SCHOOL, KIRKINTILLOCH, DUMFRIES.—An addition to Lairdland School, Kirkintilloch, has just been opened. The new school runs parallel with the old one, but is considerably longer. It is Gothic in style and the building is 140 ft. long by 32 ft. broad. It is divided into ten class-rooms—five on each flat—each of them to accommodate sixty-four pupils. The dimensions of each room are 27 ft. long by 24 ft. broad. The whole length is divided by sliding partitions, and can be thrown into one large room if required. The corridor runs along the line of the building, dividing it from the old school. It has entrances at each end with stairs to the flat above. Mr. Mitchell, of Coatbridge, is the architect.

MECHANICS' INSTITUTE, DODWORTH, YORKSHIRE.—On the 4th inst. a mechanics' institute was opened at Dodworth. The building has been erected under the supervision of Mr. Moxon, architect, Barnsley, by the following contractors:—Masons and bricklayers, Mellor & Moorhouse, Barnsley; carpenter and joiner, F. W. Ownsworth, Dodworth; slaters, P. & S. Baddeley, Leeds; plasterer, T. Lindley, Barnsley; plumber and glazier, B. Denison, Barnsley; painter, William Todd, Barnsley; heating, Newton, Chambers, & Co., Thorncliffe. The erection is constructed of brick, relieved by stone dressings, pressed brick being used for the facing of the main frontage. In addition to caretaker's house, lavatory, heating chamber, &c., the accommodation includes:—Downstairs: A billiard room, a reading room, and a room for games. Upstairs: Two class rooms over the reading room and games room respectively, and a lecture hall over the billiard room.

WESLEYAN MISSION BUILDINGS, BIRMINGHAM.—On Monday the foundation-stones were laid of a new building for the Loxley-street Wesleyan Mission, Birmingham. The plans for the new building were prepared by Messrs. Crouch & Butler. The central hall of the building will seat about 1,200 people, and in addition to this meeting-house there will be a lecture hall to accommodate 500 persons. Two rooms partly in the basement of the building will be used as a gymnasium. The structure will be built of red brick with stone dressings, will be 35 ft. by 26 ft., and the various rooms will be laid with wood blocks.

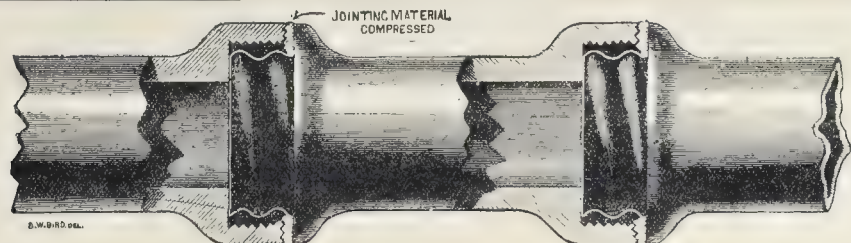
SANITARY AND ENGINEERING NEWS.

PROPOSED RECONSTRUCTION OF THE NORTH BRIDGE, EDINBURGH.—A meeting of the Edinburgh Town Council was held on the 7th inst. for the purpose of considering whether Parliamentary powers should now be obtained for the improvement and widening of North Bridge and North Bridge-street. Sir William Arrol was present for the purpose of giving a report on the subject, and he reported that he had carefully examined the state of the masonry of the North Bridge, and as far as he could see it was at present in a fairly satisfactory condition for carrying the ordinary traffic of the city. His plan No. 1—widening the bridge to 75 ft. within the parapets—involved a cost of 45,000*l.* The second plan, involving a cost of about 62,000*l.*, included extensive alterations at the north end amounting to 26,000*l.*, which would be borne by the railway company. The third plan provided for the removal of the present structure and the substitution of an entirely new bridge of three spans, of which the principal part would be steel. The cost of this new bridge erected complete would be about 80,000*l.* The bridge was so designed that it could be erected without the necessity of providing a temporary bridge or interfering with the traffic of the street. All three plans, he stated, were of the same width, 75 ft. To erect a two-span bridge would cost 10,000*l.* more. The Lord Provost moved the adoption of the report by the Lord Provost's committee, which recommended that, taking into consideration the rights and interests of the Corporation affected by the proposed Bill of the North British Railway Company, that the Magistrates and Council should meantime resolve to proceed with a Bill in terms of the notice already given, such Bill to be submitted for the consideration of the Magistrates and Council at the earliest possible date. His object was to keep the question open. He had no hesitation in saying that he did not think either the plan No. 1 or the plan No. 2 would do at all. It was something in the nature of plan No. 3 that they must go on with. Treasurer Macrae seconded the motion, which was ultimately agreed to.

FOREIGN AND COLONIAL.

FRANCE.—M. Spuller, member of the Senate, has been appointed Minister of Public Instruction and Fine Art, in place of M. Poincaré, resigned. —M. Jules Cousin, the well-known Curator of the Carnavalet Museum, has retired, and is replaced by M. Lucien Faucon, Assistant Curator of the Municipal collections. —The Académie des Beaux-Arts has awarded the Chaussegalerie prize to M. Binet, pupil of M. Laloux. The Académie has given as a subject for the Achille Leclerc prize for 1893-4, "Une Scierie." —An exhibition has just been opened at the Georges Petit Gallery, of the paintings and water-colours of the late Louis Cabat. The family of the painter have offered one to the State, for the Luxembourg Museum, one to the best of the painter's works, "Le Chemin Montant." —The Council-General of the Seine has commissioned the military painter, M. Arus, to execute for the decoration of the Mairie of Alfortville, a large picture representing "Manœuvres of Pontonniers on the Marne." —It is proposed to organise at Dieppe a museum of furniture and other objects of artistic workmanship, offered to that town by M. Saint-Saëns. —The jury of the competition by M. Suresnes for the construction of a Salle opened at Suresnes for the construction of a Salle des 1000, and the Académie has awarded the first prize to MM. Bauhain and Godefroy, the second to M. Dauvergne, the third to M. Felix Boutron —all of Paris. —The Orleans Railway Company is to open on the 18th of the month two new lines, that from Bourges to Cones, and that from Florent Issoudun. —Important works are to be undertaken shortly for the improvement of the harbour of Nice. —A rope railway is to be established to connect the town of Havre with Côte Sainte Marie. —The death is announced of M. Alexandre Guillaume, principal engineer to the railway company "de l'Est." —The sea-painter Vincent d'Ordonnais has died at Toulon at the age of seventy-seven. The works of this artist, who was medallist in his labours, are to be found scattered throughout all the museums of the South of France. —We learn also of the death of M. Georges Billouin, a painter of landscape and genre, pupil of Drolling and Cabat. He entered the École des Beaux-Arts in 1840, and obtained medals in 1865, 1869 and 1874. He has painted numerous little historic scenes in which known personages were introduced, such as "Les Prédications de Nostradamus," "Tintoret Giving a Lesson to his Daughter," "The Atelier of Rubens," "Rembrandt in his Atelier," &c., and was an able and very painstaking artist. —It is proposed to remove the artistic collections of the City of Paris into the pavilion of the Champs Élysées, in order to permit the National Society of Horticulture to continue its annual exhibitions, which were formerly very successful.

GERMANY.—Professor Rashchdorff, the architect of the new Berlin Cathedral, who holds a professorship at the Royal Technical College, has celebrated his 70th birthday. A banquet was given in his honour at which the Government, the Royal Academy and the learned bodies were represented.



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—The Dresden municipality has endowed a travelling studentship for architects as a memorial to Gottfried Semper. Its value is 80*l*. It will be open to competition next year. —Munich is to have some extensive covered markets. Designs have been prepared by Herr Rettig, the City Architect, and by Herr Eggert, of the Board of Works' office. Further designs will require an expenditure of about 8*l*,000*l*. —Bonn is apparently about to show an unprecedented activity in its public works. Competitions are to be opened for a new Town Hall, costing about 12,000*l*. A new concert hall with a theatre, and a new bridge over the Rhine, are also to be built.

BELGIUM.—According to the *Belgian News* an influential committee has lately been formed for the creation of a new "Art" Theatre. —Count de Laing's new pictures on the grand staircase of the Hôtel de Ville being completed, the redecoration of the large Council Chamber is to be commenced next year. —The Municipality of Laeken has voted 150,000 francs, or 6,000*l*., for the erection of a local museum.

VIENNA.—The new Rainaud Theatre has been opened at Vienna. It is a "People's" Theatre built without much elaboration. According to the local press there are serious defects in the plan.

JUBILEE OF SHANGHAI. The largest and most important of the Twenty Ports in China viz., Shanghai, celebrates its jubilee this year. In commemoration of the event a presentation medal has been struck, and is to be paid for out of the public funds. The medal has been designed by Mr. F. M. Gratton (of the firm of Morrison & Gratton, architects, Shanghai). It presents on the obverse an ornamental shield, supported by Chinese dragons, and bearing the words "Shanghai Jubilee, November 17, 1893," with sprays of the cotton and tea plants as ornamental fillings, and on the bend the name of the recipient. Above the shield is a steamer directed towards the rising sun. The reverse bears the Shanghai municipal coat of arms, the date of the opening of the port, "November 17, 1843," and a half-wreath composed of the rose, shamrock, and thistle. On the rim are to be engraved the words "Presented by the Shanghai Municipality." The dies have been engraved and the medals struck by Mr. Allan Wyon, of London.

MISCELLANEOUS

THE ROMAN WALL, NEWCASTLE.—According to the *Manchester Guardian*, a discovery has lately been made on the Roman Wall near Newcastle. The Wall consists of two parts—a stone wall built by Hadrian to keep back northern barbarians, and a half-wreath composed of the rose, shamrock, and thistle. On the rim are to be engraved the words "Presented by the Shanghai Municipality." The dies have been engraved and the medals struck by Mr. Allan Wyon, of London.

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This theory has lately been challenged, notably by Mr. Haverfield, who believes the earthwork to be devoid of military purpose, and probably to be older than the stone wall. Some sections cut through the earthwork by the Newcastle antiquaries now seem to show that this is actually the case. At one point, it is said, a road has been found which provided communication along the stone wall, and this road crosses over the earthwork to run along its south side. In other words, during the existence of the stone wall the earthwork was so little regarded that a road was taken across it and continued along its southern or exposed face. Further excavations may, of course, show that this discovery is something exceptional, and not characteristic of the wall or earthwork as a whole. If, however, further investigations confirm it, the conclusion we have indicated must inevitably follow, and the problem of the Vallum will be one step, and that a long step, nearer to solution. It will be a striking, though perhaps a pathetic, testimony to the paramount importance of excavation if the long labours of Dr. Bruce shall be shown to have just failed of success because he neglected the easy task of a few weeks' spade-work.

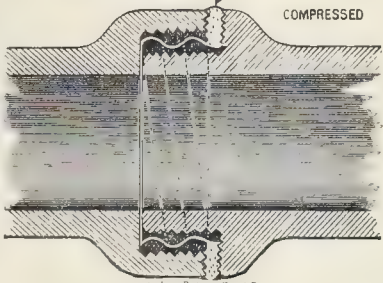
MEMORIAL STATUE, MANCHESTER TOWN HALL.—On the 8th inst. Lord Kelvin, President of the Royal Society, unveiled the Joule Memorial Statue, which has been placed in the Manchester Town Hall. The work has been done by Mr. Albert Gilbert, and the statue forms a companion to Chantry's statue of Dr. Dalton.

SVIKES' PATENT JOINT-PIPES.

This pipe-joint, made by the Albion Clay Co., is an ingenious and elaborate contrivance for securing a perfectly gas-tight and water-tight junction, and in that sense appears to be a complete success. The spigots and sockets of the pipes have a large thread-screw formed upon them in a composition which is keyed on to the pipes by a toothed key (see lower diagram), and hardens, leaving exterior surfaces with the screw-thread formed by an undulating section as shown by the white line on the diagrams. The pipes are screwed together, but the jointing material in a soft state, composed of Portland cement and tar, is placed between the flange of the one pipe and the end of the socket of the other, and squeezed up as the pipes are screwed together, which operation drives part of the jointing material into whatever space may be left between the two screws, which of course require to be left in the first instance with a certain amount of play, but are by this means filled up solid, and the material sets hard. It is impossible to imagine how anything can get through this joint. There is however one defect, which may be got over with care, but which will have to be guarded against. In the specimen left at our office we find that the jointing material has been so far rebellious that it has not allowed the end of the spigot to come close up to the flange of the socket, consequently a nick about a quarter of an inch wide is left round the interior surface where the pipes butt. Now it is quite true, as the patentees say, that their joint prevents or renders improbable the formation of any internal ridge at the joints (by wet cement coming through and setting); but a furrow at the joints is only a degree less mischievous; it checks the flow of the sewage and catches small solids, and it may lay the foundation for building up a ridge which will be as mischievous as the cement ridge. The specimen sent to us may have been badly joined, but there is the furrow there, and it is a defect.

BUILDERS' WORK AND THE LONDON SCHOOL BOARD.—At the meeting of the School Board for London, held at the Board-room, Victoria Embankment, on Thursday, the Works Committee reported that the Board on November 9, 1893, referred to the Committee for consideration and report the following Memorial, which had been presented to them from the London Building Trades Federation:—"1. That the recognised minimum rate of wages for the London district has not been adhered to by the Builders who do the Board's work. 2. That the Board should insist on all contractors tendering to the Board's work supplying a schedule of wages paid to their employees, and if found less than the Trade Union rate of wages, the tender be not entertained. 3. That the Board do insert a clause in all contracts to the effect that no portion of the contract work be sublet to any workman or workmen. 4. That in such parts of the work appertaining to a contract as cannot be done entirely by the contractor in the ordinary course of his business, sub-contracting be only allowed by the direct sanction of the Board. 5. That the workmen employed directly by the Board are not paid the recognised minimum rate of wages for the London district. The Memorialists, therefore, pray that the School Board for London will favourably consider their requests embodied in this Memorial." The Committee were of opinion that a reply should be forwarded to the Memorialists to the following effect:—"1. That all cases of complaint to the Works Committee, some even made anonymously, have been investigated immediately by the officers of the Architect's Department, and that, generally, if not universally, the complaints have not been established. The wage books have shown that the men have signed for the amount which is either at or above the minimum rate of wages. The officers of the Board have no means of testing the correctness of the information for or against; whereas, the matter is easily settled in a magistrate's court. 2. That the contract already contains the following clause:—"Where the London scale of wages shall apply, the contractor shall pay to the workmen employed by him not less than the minimum standard rate of wages in each branch of the trade. In all other districts where the London Scale of Wages shall not apply, the contractor shall pay the

JOINTING MATERIAL COMPRESSED



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workmen, and all other persons employed by him in connexion with his contract, not less than the minimum standard rate of wages, which may, for the time being, be usual and generally paid where such workmen are employed." That the rates are liable to variation, and therefore a schedule might not have force during the two or three years which are occupied in building a school. 3. The Board's Architect reports that subletting is not, and never has been, allowed to a workman or workmen, but if at all, only to some firm of experienced and acknowledged position in the special line, with whom the same conditions are insisted upon. 4. That no part of the work can now be sublet without the permission of the Architect, who reports his action to the Works Committee. The Board would have to obtain the opinion of that officer (their professional adviser), and except that some considerable delay would occur, probably little or no change in procedure would ensue. 5. That the workmen employed by the Board are now paid the recognised hourly rates of wages for the London district.

"FIRE-PROOF AND SOUND-PROOF PARTITIONS."—The "Fire-proof, Cementing, and Plastering Company" send us under this heading sections and a description of their form of partition, which is built up of blocks, preferably about 6 ft. by 10 in. by 2 in. thick, formed of hollow tubes embedded in and faced with the company's patent fire-proof cement. They claim for this method the advantages of being light, sound-proof (owing to the interior hollow tubes) and a very little thickness. We should doubt the sound-proof quality being complete, as there is a continuous thickness of cement between the tubes, but no doubt the hollow tubes will to an appreciable extent diminish the transference of sounds through the partition. The blocks are clamped at intervals to the framing. The partition seems a good sound one, fire-resisting and economical of space; but we confess we are in favour of a partition which is solid throughout rather than one with hollow spaces in it.

ART EXHIBITION AT DOUGLAS.—The sixth exhibition of the Isle of Man Fine Art and Industrial Guild was opened on the 6th inst. at the Palace, Douglas. Oil paintings, water-colours, and decorative painting are exhibited; and other exhibits comprise carving, needlework, school work, laundry work, &c. Specimens of plain and fancy brick making on the Russian principle were introduced by Mr. A. C. Kelly, of Ballantrae, who opens out a new industry in the island.

LEGAL.

TYLER & SONS v. SHARPE BROS. & CO.:
ALLEGED INFRINGEMENT OF A REGISTERED DESIGN.

THE case of J. Tyler & Sons, Limited, v. Sharpe Bros. & Co. came before Mr. Justice Romer in the Chancery Division on the 8th inst., it being an action brought by the plaintiffs, of London, against the defendants, of Burton-on-Trent, for an injunction and damages in respect of an alleged infringement by the defendants of a registered design of the plaintiffs', in respect to water-closet basins, the registration of which was effected in 1890. The defendants denied the infringement, and also suggested that the plaintiffs' design had been anticipated in respect to basins by their own water-closets, and

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Prizes.	Designs to be delivered.
1. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	1st, £100; 2nd, £50; 3rd, £25.	Jan. 1/94
2. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	1st, £100; 2nd, £50; 3rd, £25.	Jan. 1/94
3. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	1st, £100; 2nd, £50; 3rd, £25.	Jan. 1/94
4. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	1st, £100; 2nd, £50; 3rd, £25.	Jan. 1/94
5. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	1st, £100; 2nd, £50; 3rd, £25.	Jan. 1/94

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
1. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	A. M. Fowler	Dec. 18
2. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	A. M. Fowler	Dec. 18
3. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	A. M. Fowler	Dec. 18
4. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	A. M. Fowler	Dec. 18
5. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	A. M. Fowler	Dec. 18

CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
1. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	A. M. Fowler	Dec. 18
2. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	A. M. Fowler	Dec. 18
3. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	A. M. Fowler	Dec. 18
4. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	A. M. Fowler	Dec. 18
5. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	A. M. Fowler	Dec. 18

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applicants to be in.
1. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	A. M. Fowler	Dec. 18
2. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	A. M. Fowler	Dec. 18
3. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	A. M. Fowler	Dec. 18
4. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	A. M. Fowler	Dec. 18
5. Liverpool Sch. Bd.	Hartlepool Sch. Bd.	A. M. Fowler	Dec. 18

Those marked with an Asterisk (*) are advertised in this number. Competitions, p. iv. Contracts, pp. iv, vi, and viii. Public Appointments, pp. xviii, xix, and xxi.

in respect to other parts of the combination by other manufacturers.

Mr. Fletcher Moulton, Q.C., and Mr. J. E. Graham appeared for the plaintiffs; and Mr. Neville, Q.C., M.P., and Mr. Frank Evans for the defendants.

His Lordship, in giving judgment, said that he had come to the conclusion, on the evidence, that the plaintiffs' design was novel and original, having regard to the nature of the subject-matter to which it was applied. He was much impressed in considering the question by the undoubted fact established before him that directly the plaintiffs' design was put on the market at once acquired considerable popularity and a large sale. The so-called anticipations of that design, so far as proved before him, were never practically sold at all, and, in his opinion, on the evidence, it was established that the plaintiffs' design had distinct advantages over the prior design for similar articles which had been put in evidence on behalf of the defendants. He was of opinion that the plaintiffs had established their case and were entitled to the usual injunction with an inquiry as to damages and the costs of the action.

Judgment accordingly.

MEETINGS.

FRIDAY, DECEMBER 15.

Institution of Civil Engineers (Students' Meeting).—Mr. H. J. Orford on "Continuous Automatic Railway Brakes." 7.30 p.m.

MONDAY, DECEMBER 18.

Royal Institute of British Architects.—Mr. William Simpson on "The Classical Influence in the Architecture of the Indian Region and Afghanistan." 8 p.m.
Surveyors' Institution.—Mr. E. J. Castle, Q.C., on "The Valuation (Metropolis) Bill, 1893." 8 p.m.
Leeds and Yorkshire Architectural Society.—Mr. F. W. Troup on "The Use of Seconds." 7.30 p.m.

TUESDAY, DECEMBER 19.

Institution of Civil Engineers.—Mr. E. B. Ellington on "Hydraulic-power Supply in London." 8 p.m.
A. A. Lyric Club.—Special Smoking Concert, to be held at St. Martin's Town Hall, Charing Cross. 8 p.m.
Geological Association.—8 p.m.

WEDNESDAY, DECEMBER 20.

Society of Arts.—Adjourned Meeting for further discussion of Mr. Lewis H. Isaac's paper on "Carriage-way Pavements for Large Cities." 8 p.m.
London Foreign and Clerical of Works Institution.—Annual Meeting of the Directors. 8 p.m.
Liverpool Engineering Society.—Mr. G. L. Burton on "A Tour in South Africa." 8 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

164.—FLUSHING CLOSURES; *J. Merrill.*—According to this invention a syphon trap is fixed at the outlet of the syphon and an air pipe is connected with the outlet of the syphon and the water level in the flush tank for the purpose of economising the water and securing an efficient flush.

405.—DRAUGHT PREVENTERS; *L. L. Gough.*—According to this invention a strip of wood to which is affixed

strip of lake is employed as the preventer. This is governed by a lever spring, which lifts the strip clear of the floor when the door is opened, and returns it to its place as the door is closed.

515.—WATER-CLOSURES; *J. Day.*—This invention consists of an arrangement of mechanism and construction which greatly reduces the liability of the close pipes to foul, and reduces the difference of level between the flushing supply and the outlet syphon.

1150.—DOOR BOLTS; *J. Catrine (transp.)*—This is a plan for operating the bolts of a door by means of two cords, which are placed in any part of the room desired. One tassel catches and the other opens the bolt and the door. The bolts being kept in place by the cords.

1150.—STATE CLAIMS; *DOERFELN, & J. Mellie.*—A perforated piece of suitable material is, according to this invention, made to fit over small oval or circular blocks of india-rubber, the blocks being kept in place by the perforations. The plate may be changed or moved for the purpose of replacing or renewing the blocks as they become worn.

1752.—VENTILATORS; *F. and L. Koeffer.*—According to this invention, to facilitate the opening of the flap, the series is united by a brass rod and controlled with a worm and small-wheel which operates all the flaps at once.

NEW APPLICATIONS FOR LETTERS PATENT.

NOVEMBER 27.—22,605, J. Mitchell and W. Morrison, Stoves, Register Grates, &c.—22,727, H. Collett, Sanitary Closet Basin and Trap.—22,730, A. Ruecher, Rust-resistant Paints.—22,731, J. Worsley, Heating Buildings, &c.—22,747, M. Van der Peck, Automatic Flushing Apparatus.

NOVEMBER 28.—22,542, W. Edin Flushing Apparatus.—22,781, W. Allen, Water-closets or Water-closet Basins.—22,790, W. Osment, Hanging of Sliding Window Sashes.—22,818, H. Mork, Holding or Supporting Devices for Gas-pipes, &c.—22,873, J. Moore, Step-ladders.—22,892, E. Halmshand, Manufacture of Bricks, Tiles, Pavings and Slabs, with Slag or Granite Chips.—22,897, B. Bramel, Baths and Lavatories.—22,924, T. Mills, Silent Draught-preventing Rolling Doors.—22,935, J. Fenton, Draught-preventers for Doors.—22,930, T. Hildebrand, Roofing Tiles or Plates.—22,961, F. Crane, Paints or Driers.

NOVEMBER 30.—22,978, T. Potter, Fire-resisting Floors.—22,985, T. Atkins, Detachable Sash-lifter Lever.—22,989, E. Ingram, Wood Paving.—22,993, A. Jones, Door Handles and Catches.—23,072, J. Stephenson and A. Dorman, Sliding Windows.—23,018, L. King, Wood, Tile, and Panel.—23,024, J. Neal, Handle for Tools.—23,033, C. Maden, Self-closing Doors, Shutters, &c.—23,038, K. Robinson and R. Buck, Brick Cutting Tables.

DECEMBER 1.—23,073, I. Wall and N. McCreedy, Saw.—23,090, B. Ducloux, Iron Buildings.—23,100, F. Dye and J. Wells, Chimney Pits.—23,111, H. Lake, Setting Saws.—23,112, H. Lake, Apparatus for Closing Doors.—23,120, W. Wilson and W. Priest, Manufacture of Paints or Paints Materials.

DECEMBER 2.—23,163, H. Lancaster, Construction of Fireproof Floors, &c.—23,208 and 23,209, W. Allen, Chimney Cows.

PROVISIONAL SPECIFICATIONS ACCEPTED.

18,793, T. Martin, Pipe Wrenches.—19,681, H. Barrance and E. Simmons, Attachment of Knobs to Spindles.—20,091, A. Marchant, Window Ventilator.—20,180, W. Cruikshanks, Syphons for Cisterns.—20,839, J. Atherton, Waste Water-closets.—21,204, D. McLean, Work or Pressure Valves for Water-closet Service Cisterns, &c.—21,304, T. W. Keith, Testing and Flushing of Drain-pipes, Soil-pipes, &c.—21,471, W. Lindsay, Trends orearing Surfaces for Floors, Staircases, &c.—21,475, W. Wheeler,

Siphon in Cisterns and Water-waste Preventers.—21,499, A. Brown, Water-tight or Fire-proof Doors.—21,569, T. Houghton, Improved Joint to Meeting Rails of Sashes.—1862, J. Giegie, Window Sashes.—21,567, E. Green, Drain-traps.—21,600, J. Sharp, Fire-grates.—21,607, C. McPherson, Grates and Working Resisting Sashes.—21,684, C. Korte, Starting Siphon in Flushing Cisterns.—22,019, J. Lowe, Flooring Cans.—22,072, J. Slater, Fire-grates.—22,093, W. Bannochie, Fire-grates.—22,103, H. Deifies, Window Frames.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

7,456, J. Whitaker, Brick-presses.—9,731, J. Kunz and A. Holgraf, Portable Building as a Military Hospital.—19,001, H. Hazzan, Process for Finishing Wall Coaters.—21,606, M. Adams, Ventilating and Disinfecting Appliances.—20,814, W. Watson, Man-hole Frames and their Covers.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

NOVEMBER 29.—By A. Richards (at Tottenham): 15 to 25 (odd), Park-lane, Tottenham, £1,000.

DECEMBER 5.—By F. & G. Green: Nov. 23, 24, Newington Green, £1, 841, 1500.—By Norman & Son: 2 to 16 (even), Lampen-st., Victoria Park, and 1, Jedred-st., u.t. 83 yrs., g.r. 451, 100, 300, 67, Abbey-wd., St. John's Wood, u.t. 57 yrs., g.r. 156, 67, By Walker & Son: 10 to 20 (odd), Whitechapel, u.t. 73 yrs., g.r. 41, 105, 175, 7, Walden-st., u.t. 70 yrs., g.r. 151, r. 281, 421, 144, Jubilee-st., Mile End, u.t. 15 yrs., g.r. 41, 92.—By F. Farley: 2 plots of f. land, Highbury-road, Boush's Green, 64, 18, 20, Compston-st., Pancras, u.t. 77 yrs., g.r. 31, 108, r. 110, 305, 168, Fairbridge-rd., Holloway, u.t. 74 yrs., g.r. 61, r. 261, 150, 53, Vories-rd., u.t. 57 yrs., g.r. 71, r. 261, 160.

DECEMBER 5.—By W. J. Collman: 6, Barnett-ter., Leytonstone, £1, 221, 230.—By Dehnam, Tewson, & Co.: 30 to 51 (odd), Highgate-rd., Kenilworth Hill, area 39,900 ft., £2,200, 44, Rushmore, Hoxton, u.t. 41 yrs., g.r. 41, 158, r. 401, 300.—By Mark Little & Son: 21 to 27 (odd), Bow Lane, Poplar, £1, 750, 41, 33, Zealand-st., Bromley, u.t. 70 yrs., g.r. 41, 260, 33, 35, Zealand-st., u.t. 74 yrs., g.r. 81, 240, 42, West-av., Walthamstow, u.t. 61 yrs., g.r. 51, r. 261, 235.—By Bruckman, Rogers, & Co.: 13, Boyson-rd., Waltham, u.t. 57 yrs., g.r. 61, 61, r. 381, 350, 70, Inville-rd., u.t. 58 yrs., g.r. 41, 220, 101 to 107 (odd), Inville-rd., u.t. 58 yrs., g.r. 21, 115, 16, 18, 20, 109, 111, and 113, Inville-rd., u.t. 58 yrs., g.r. 21, 115.

DECEMBER 6.—By Ellis, Morris, & Co.: 24, Aylesford-st., Pimlico, u.t. 44 yrs., g.r. 81, 350.—By Jenkins & Son: 53, St. Mary's-rd., Beckenham, £1, 321, 401, 23, 25, Douglas-st., Deptford, u.t. 58 yrs., g.r. 81, 81, r. 821, 108, 580, 6, Creek-rd., u.t. 45 yrs., g.r. 61, r. 301, 110, 31, Westmore-rd., Lewisham, u.t. 75 yrs., g.r. 41, 41, 180, 180.—By J. & H. Potter: 4, Chapel Row, Willesden, £1, 130, 4, 5, Bridge-st., Kilburn, u.t. 65 yrs., g.r. 101, r. 381, 300, 60, Brondesbury-rd., u.t. 85 yrs., g.r. 101, 108, r. 601, 450.—By D. & J. Long: L.g.r. of 99, 68, Stewart-st., u.t. 401, 450, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

Waterloord, u.t. 29 yrs., g.r. 61, 108, r. 430, 200.—By W. A. Blakemore: 17, 19, 53, 55, 57, Mayfield-rd., Walthamstow, £1, 550, 1, 2, 3, Prospect Cottages, £1, 450, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 1

LONDON.—A good set of new water-closets and sanitary work at St. Matthews Schools, Canonbury.—*£250 0 0*

NEWCASTLE-ON-TYNE.—For the construction of Newcastle City Asylum extension, Gosforth, for the Visiting Committee, Mr. J. A. Lysons, architect, 2, Fawcett-street, Newcastle-on-Tyne. Quantities by Mr. George G. Lister, 1, Fawcett-street, Newcastle-on-Tyne. Mr. C. Tyrie, 1, Fawcett-street, Newcastle-on-Tyne. Mr. J. L. Malar, 1, Fawcett-street, Newcastle-on-Tyne. Mr. W. Lowry, 1, Fawcett-street, Newcastle-on-Tyne. Accepted on schedule of prices. Comparative approximate estimate range, £1,000 to over £1,500.

SOUTHAMPTON.—For the construction of a new building, for the Southampton Harbour, Mr. Albert D. Greatorex, C.E., Surveyor. Mr. J. H. P. S. I., Surveyor, Southampton. Joseph Butt, 1, Fawcett-street, Newcastle-on-Tyne. Mr. F. Osman, 1, Fawcett-street, Newcastle-on-Tyne. Mr. C. Batten, 1, Fawcett-street, Newcastle-on-Tyne.

ST. ALBAN.—For the construction of a new building, for the St. Alban's, Mr. Albert D. Greatorex, C.E., Surveyor. Mr. J. H. P. S. I., Surveyor, Southampton. Joseph Butt, 1, Fawcett-street, Newcastle-on-Tyne. Mr. F. Osman, 1, Fawcett-street, Newcastle-on-Tyne. Mr. C. Batten, 1, Fawcett-street, Newcastle-on-Tyne.

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WATFORD.—For the construction of a new building, for the Watford, Mr. Albert D. Greatorex, C.E., Surveyor. Mr. J. H. P. S. I., Surveyor, Southampton. Joseph Butt, 1, Fawcett-street, Newcastle-on-Tyne. Mr. F. Osman, 1, Fawcett-street, Newcastle-on-Tyne. Mr. C. Batten, 1, Fawcett-street, Newcastle-on-Tyne.

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A Smoking-Room in a London Mansion.—Professor Aitchison, A.R.A., Architect	Double-Page Ink-Photo.
Competition Design for Glasgow Art Galleries.—Messrs. Morris & Hunter, Architects	Double-Page Photo-Litho.

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"London Streets and Buildings" Bill.



HE proposed Bill of the London County Council under this title, so far as we can judge from a necessarily rapid perusal of it, appears to be, in the main, a good practical measure, drawn up so as to provide as far as possible for all contingencies which can be legally dealt with, and its machinery seems less complicated than might have been expected in a Bill designed to deal with such an immense variety of work and such a number of conflicting interests. A certain degree of elasticity in its working is provided for in the insertion of clauses empowering the Council in various instances and under special circumstances to relax the letter of the general regulations.

The subject of the formation and widening of streets properly comes first in the Bill. In providing that no person shall commence to lay out any street for carriage or foot traffic without having first obtained the sanction of the Council, the "commencement" of a street is prudently defined "as indicating the course or direction thereof either by erecting posts or a fence or other boundary or by laying down lines of kerbing or removing the surface of the ground;" thus providing against that appearance of a kind of right in virtue of commencement of work which is sometimes met without its influence in a court of law. It is not surprising to find, after the policy which the Council has already displayed in regard to gates and bars, that the idea of semi-private streets is entirely discountenanced. Among the grounds for refusing to sanction a plan of a street are named, when the street, being a carriage-way, does not form a connexion between two streets of similar class, and when any street is proposed to be formed "without being open at both ends from the ground upwards." As far as the latter provision refers to a street closed by a wall or a building at one end we should of course entirely concur in it, on sanitary grounds; but with that exception both these are what we should call doctrinaire clauses. They would prevent for all time that occasional

formation of retired and semi-private streets which is one of the privileges most valued by wealthy residents in a great city, and the present existence of which to a certain extent is one of the agreeable features of London; and there are certainly special occasions when the enclosure of one end of a street by an open railing (so as not to interfere with ventilation) would be a concession which might be made without any detriment to the general public, and to the great advantage of the tenants of the street. But these days are over, and the interest of those who traverse the streets is to be considered solely, to the entire exclusion of the interests of the residents in the houses which line them. Are not these latter also a portion of "the public?" We do not see any provision for the occasional relaxation of this regulation at the pleasure of the Council, but such a provision might well have been made. The provisions as to the width of streets seem on the other hand to err on the side of too little liberality. The average requirement for a carriage-way is 40 ft. clear, or 20 ft. from the centre of the roadway to the nearest external wall or fence boundary; but when the Council shall be of opinion that the special importance or length of the street render it desirable "in the public interest" to increase this normal width they may require an increased width, "but nothing in this section shall authorise the Council to require a greater width than 60 ft." In whose interests are these limitations inserted? Certainly not "in the public interest" in the true sense of the words. We hope these clauses will be attacked in Parliament; they are almost ludicrously inadequate. The whole thing is turned the wrong way about. Forty feet is a sufficient width for certain classes of streets, no doubt, but to take it as the average width to be contemplated is absurd; and where the Council are to be empowered to require a greater width, why have they tied their hands to 60 ft.? Think of the noble wide streets of Paris, with their ample foot pavements, and see what such a regulation reduces the future of London streets to. One of the worst points about the general aspect of London is the miserable narrowness of the majority of her streets, an evil which the Council are thus proposing to perpetuate by Act of Parliament. What makes it more absurd is that it is universally

held by all who have considered the subject of the ratio of height to width in streets, that a street should not be lined with buildings the height of which is greater than the space which separates them, and this Act contains a clause limiting the height of buildings (except under special permission) to 75 ft., the Council have actually limited the width of streets to 60 ft., and this width to be required only in special cases. The passing of such regulations would be disastrous as regards all future attempts to give greater dignity, beauty, and spaciousness to London streets; we say beauty, for the best architectural design is half thrown away when inserted in a street too narrow for it to be properly seen. One can hardly be surprised at these provisions, for the London County Council after all is only a large vestry, and has the typical vestry's indifference to mere questions of dignity and stateliness in cities; and we presume these narrow ideas on roadways are framed on the vestryman's notion of economy in compensation for property taken for streets, and in street-cleaning afterwards; but the passing of such clauses would be most detrimental to the future of London, and we hope the Council will hear some plain criticisms on them from those who know better.

On the other hand, while the Council will not leave themselves the liberty to allow us streets of decent width, we observe that they are careful to provide a clause (12) empowering them to consent to erection or retention of buildings within less than the prescribed distance from the centre of the roadway. They put the width of a road as low as can possibly be accepted, and then retain the right to restrict it still further. All this will not do, and a determined stand ought to be made against it.

The power to decide on the naming of streets, and to re-name and re-number them where necessary, and the regulations in regard to this subject, though they are likely to be unpopular, and the exercise of the power generally causes a good deal of public irritation, are we think quite necessary. The naming of streets is properly a matter for the municipal governing body to decide; it is so in other capitals, and a good deal of trouble would have been saved if it had always been authoritatively supervised in London.

The provisions for open spaces and the

height of buildings appear to be adequate, but it cannot be said that the rule for determining the relation between the height of a building and the width of the open space at the rear of it is very clearly expressed:—

"(4) The relation between the height of any new building and the space required in the rear thereof shall be fixed and ascertained as follows:—

(a) A line (hereafter referred to as 'the horizontal line') shall be drawn at right-angles to the roadway formed or to be formed in front of the building and through or directly over a point in front of the centre of the building;

(b) The horizontal line shall be produced to intersect the boundary of the open space furthest from the said roadway;

(c) The horizontal line shall be drawn throughout at the level of the pavement formed or to be formed in front of the centre of the building, unless the site of the building incline towards the roadway or site of the roadway in which case the horizontal line shall be drawn directly over the said point in front of the centre of the building at the natural level throughout of the ground at the boundary of the space furthest from such roadway where such boundary is intersected by the horizontal line;

(d) A second line (in this part of this Act called 'the diagonal line') shall be drawn in the direction of the building above and in the same vertical plane with the horizontal line and inclined, thereto, at an angle of forty-five degrees and meeting the horizontal line where it intersects the boundary of the space furthest removed from such roadway."

It is to be presumed that the height of the building is to fall within the diagonal line, but no further explanation is given; if the diagonal line is to be drawn "in the direction of the building," from the centre of the boundary of the space in the rear, then "meeting the horizontal line" at that point is a misleading expression, as it is drawn from that point. We can imagine that clause causing much searching of heart among the ranks of speculating builders; what is generally intended by it is obvious enough, but it certainly might have been more clearly expressed. Nor do we very well understand the provision in regard to the courts and shafts of a building:—

"Whoever after the passing of this Act shall construct for purposes of light and air a court or shaft enclosed wholly or partly on four sides shall, if the depth of such court or shaft measured from the level of the ceiling of the ground story to the eaves or top of the parapet exceed the length or breadth of such court or shaft provide a clear opening or openings for ventilation having a total sectional area of not less than 50 ft. the whole of which opening shall be within 20 ft. of the level of the pavement of the adjoining street and such openings shall at no time be closed otherwise than by open iron doors or grids whereof the collective openings shall be equal to at least three-fourths of the area of such doors or grids."

What is the meaning of this it is difficult to understand. Are the openings for the ventilation of the court or shaft? And if the court or shaft is within the building, how are the openings to introduce ventilation? Or are they for the ventilation of the building? The whole thing is most vague. Another clause we notice in this section is that no one shall rebuild, alter, or enlarge houses so that they stand wholly or in part back to back "without the consent of the Council"; a liberty of concession which is not desirable, because it is one that ought never to be granted. The section concludes with a clause providing that no building shall exceed in height the width of space to the building on the opposite side of the street; but, as before remarked, this clashes with the 75 ft. height limitation and the limitations as to width of street; the two might have been drawn up by two different bodies.

In the section on the construction of buildings we note that while the old provision that woodwork in an external wall shall be set four inches back from the face of the wall is retained as a general regulation, it is provided that it shall be lawful for the Council by by-law to exempt from this provision oak, teak, or other wood, "provided the work be constructed to the satisfaction of the District Surveyor." This is an innovation which has long been called for. The time-honoured requirement that all beams, bresssummers, &c., should have a bearing of at least four inches on the walls might very well have been

altered to six inches as a general requirement, with power to relax it in case of small work. There are certainly many cases in which four inches bearing on the walls is not sufficient for the best construction, but builders of a certain class will always avail themselves of the legal liberty to reduce it to this. The requirement that every building above 60 ft. in height shall be provided on the stories above the 60 ft. with such means of escape in case of fire for the persons dwelling or employed thereon "as can be reasonably required under the circumstances of the case," is at all events a recognition of one important requirement in lofty buildings, though the clause certainly cannot be said to be very drastic in its wording. The regulation about habitable rooms over stables also comes short of what ought to be required: "the floor shall have in every part not occupied by a joist a layer of concrete pugging of good quality 3 in. in thickness." The provision ought to be that the floor should be a solid one of concrete and iron, or at all events a solid concrete floor, however constructed, shutting off the stabling from the apartment over it as completely as a wall.

Under the heading "Construction" we notice also the exemption from the rule as to the limitation of cubical contents to 216,000 cubic feet, any buildings used wholly for the manufacture of the machinery and boilers of steam vessels, or for a retort house for the manufacture of gas, or for generating electricity, provided that such building consist of one floor only and be constructed of brick, stone, iron, or other incombustible material throughout, and shall not be used for any other purpose than those specified. Such buildings, however, are required to be situated more than two miles from St. Paul's Cathedral. The Council, however, reserve the right to license larger cubical contents in special cases, when they are satisfied that such extension of the cubical space is necessary, and that proper arrangements have been made for lessening danger from fire, "so far as reasonably practicable." This is a proper provision, as cases may certainly arise in which it may be desirable to make an exception to this otherwise salutary rule, which has already been the cause of difficulty in some instances.


The sections as to rights of adjoining owners and as to dangerous structures are clearly worded. A section in regard to "dwelling-houses on low-lying land" is important as dealing with a subject which has caused many difficulties in drainage in certain quarters of London. It is now proposed that it shall not be lawful for any person to erect any building which is to be used wholly or in part as a dwelling-house, or adapt any existing building as a dwelling-house, which is so situated as not to be drained by gravitation into an existing sewer of the company, except by the special permission of the Council and in accordance with such by-laws as the Council may prescribe for buildings so situated. One of the sub-sections of this clause empowers the Council to prescribe the level at which the under side of the lowest floor of such a building should be formed. No suggestion is made as to the details of the manner in which the site is to be treated where the level of the lowest floor may be ordered to be kept above the ground level; that we presume is regarded as a matter to be considered according to the circumstances of each case; but the general clauses on this subject are certainly to be approved.

It is not quite clear whether the first clause in the section relating to "Superintending architect and surveyors."—"The Council may for the purpose of aiding in the execution of this Act appoint some fit person to be called the 'Superintending Architect of Public Buildings'"—implies the creation of any new professional officer, but we presume it is only a formal confirmation of the existing power of appointment. One of the clauses in this section provides that where by reason of any emergency any work

is required to be done immediately and before notice can be given it may be done, on condition that notice is given twenty-four hours after it has been begun. This is a reasonable provision, and in general there seems to be a desire throughout the Act to avoid tying people up too closely in the bonds of red tape. As to the question about which there was a discussion at the Institute the other day, in regard to the hardships involved to builder and building-owner in not notifying a contravention of the by-laws till after it has been carried out, and the possibility of the District Surveyor notifying on the basis of furnished plans, no suggestion is made, the Council probably being of the same opinion which was expressed in the course of the discussion alluded to, that a magistrate can take no action against a breach of the law until the breach has actually been made. After all, it is possible for any builder to know whether he is breaking the law, and perhaps the most suitable answer to that kind of complaint is the one we once heard made by a municipal official in response to an appeal as to the trouble and expense he was causing—"People who do wrong generally do get into trouble."

In regard to details of wording there may be occasion for further criticism of this Act than we have been able this week to go into. In the main, as we have said, it seems a well-worded and a practically workable Act, the great defect in it being the provision for permanently fixing on London the defect of narrow streets.

ABOUT THE FALL OF A FACTORY CHIMNEY.

URING the disastrous gale of November 18, which caused so much destruction to shipping and loss of life on the British coasts, a factory chimney 35 yards high was blown down at Huddersfield, killing two men who were working in an adjoining shed. From the evidence produced at the inquest it appears that the chimney, which was square on plan and constructed of brick, was erected nineteen years ago, but was at that time only carried up to a height of 25 yards. The chimney was 6 ft. 1½ in. wide at the base, and was carried up vertical to a height of 21 ft. 6 in., and 18 in. in thickness, including a firebrick lining, which was built in as part of the structure to a height of 11 ft. From the level of 21 ft. 6 in. above the ground, the chimney was of 14 in. brickwork, and was "battered" to the summit, where the width was 4 ft. 6 in.

About two-and-a-half years ago, a greater draught being required, the chimney was raised 10 yards more, the new part being of 9 in. brickwork, and "battered" to 3 ft. 6 in. at the top.

The original chimney had therefore a height equal to about twelve times the width of the base, while the raised chimney had a height equal to about seventeen times the base. The safe proportion for such a structure is considered by good authorities to be ten to one. The place where the fracture took place was 32 ft. above the ground-line, and was abuted to a height varying from 30 ft. to 40 ft. by adjacent buildings on three sides.

Mr. John Waugh, C.E., of Bradford, who had been appointed assessor by the Coroner, under an authority from the Home Secretary, attributed the disaster partly to the height of the chimney being too great as compared with the width of the base, which should have been 10 ft. instead of 6 ft., but principally to the fact that it was abuted against by the walls and roofs of the adjacent buildings on three sides, which gave rigidity to the structure for a height of 30 ft. to 40 ft.; whereas such a chimney should be perfectly free to oscillate in all directions when shaken by the wind. The chimney was also weakened to some extent by having openings near the base on three sides, two of which

were 4 ft. 3 in. high by 1 ft. 5 in. wide, and the other 6 ft. high by 1 ft. 10 in. wide. The chimney also had a decided cant in the direction in which it fell, either from the action of the wind upon it or from a subsidence in the ground.

Having these data to go upon we can with tolerable accuracy calculate the force that was required to overturn the chimney about the point of fracture, which we take as 32 ft. from the ground, at which height the width would be 5 ft. 9 in.; and the area of one face from this point to the height of 75 ft. is $43 \times 5\frac{1}{2} = 248$ sq. ft.

The area of one side of the upper part, or addition, is

$$30 \times 4 = 120 \text{ sq. ft.,}$$

so that we have a total of 368 sq. ft. of surface acted on by the wind when blowing directly upon one side.

The cubical contents of the 14-in. work is 796 cubic feet, and of the upper 30 ft., or 9-in. work, is 293 cubic feet. Taking the weight of the brickwork as 1 cwt. per cubic foot, we have for the total weight of the chimney above the point of fracture

$$1,089 \text{ cwt.} = 121,968 \text{ lbs.}$$

This mass would have a leverage of half 5 ft. 9 in., or 2 ft. 10½ in. at the point of fracture; so that the *moment* of resistance taken about that point is 350,658.

If p is the pressure per sq. ft. of surface which would just overcome the effect of the weight, then we have for the *moment* of the pressure on one side of the chimney supposed to act at its centre of gravity (which is 33 ft. above the point of rupture)

$$p \times 368 \times 33 = p \times 12,144.$$

Equating this with the *moment* of resistance, we have

$$p \times 12,144 = 350,658$$

$$\text{or } p = 28.87 \text{ lbs.,}$$

which is the pressure per ft. on the surface which would just be on the point of causing rupture. This would give a velocity of 75 miles an hour for the wind.

Scientific observations on the force of the wind at a station 200 ft. above the base of chimney, showed that on that day the wind pressure registered was 18 lb. per square foot, and the velocity of the wind sixty miles an hour; but the observer considered that the pressure would be greater down in the valley where the chimney stood. It is reported, however, that on December 12 a pressure of 37 lbs. per foot was registered at Greenwich Observatory, although the force of the gale on that day was rather less than on November 18; and this would be much more than sufficient to overthrow such a structure.

Mr. Waugh was of opinion that a properly-built and proportioned chimney ought to be able to resist a pressure of 50 lbs. per foot, or nearly double that which we have shown would cause this chimney to fall; but this would only be produced by wind moving at the rate of 100 miles an hour, a velocity never approached in this country, although one of 120 miles was recorded during the hurricane in Florida a few weeks ago.

NOTES.



E print in another column a letter from an architect (Mr. Swinfen Harris) *abrops* of the Bath Pump-room competition, repeating the view which other correspondents have occasionally set forth, that unless the decision of the assessor in an architectural competition is absolute and binding there is no use in having an assessor; and we received the other day a private and strongly-expressed letter to the same effect from an architect who we conclude (though he did not say as much) is the author of the design selected by Mr. Waterhouse in the Bath competition. We have before endeavoured to persuade architects that this view is hardly reasonable, unless the assessor has accepted the office on those terms. It is open to any eminent architect who is invited to act as assessor in a competition to decline to act unless he has

the written undertaking of the Committee that they will abide by his decision absolutely. It is, however, very possible that in that case he would not be engaged. As we have before said, it cannot be expected that the people who are going to pay for and use the building should surrender their right of choice absolutely to an outsider.* The argument that in that case the appointment of an assessor is of no use is quite a mistake. The probability is that the Committee will make a great deal better choice with the assistance of the assessor's advice, and that in most cases they will accept his advice, believing that it is the best thing they can do. Occasionally they will not, and then we hear the cry, "What is the use of an assessor?" The use has been that in a majority of cases the Committee have accepted the assessor's award; and even where they have not, it is very possible that without him they would have made a still worse choice. The assessor has certainly been an influence, in spite of this occasional departure from his ruling; if architects try to set up the demand that in all cases the assessor shall have absolute right to impose his choice on the Committee, the result will be very likely to put an end to the assessor altogether; and although it is probable that an able architect acting as assessor would select the best design, it is not by any means certain that he would; he is only mortal; and people of average sense and education will claim to have some opinion of their own as to what they are going to spend their money on. What we do hold, however, is that every one who is invited to act as an assessor should first distinctly ask the Committee, "Do you wish me to make the award, or do you wish me only to report and advise?" And in the former case he should have a distinct understanding that his award will be upheld. But he may do a great deal of good in the latter case also, with no such formal stipulation, if he is dealing with an honest and well-intentioned Committee.

PROFESSOR OVERBECK'S pupils have celebrated his "Jubilee" by dedicating to him a "Festschrift" consisting of eighteen important archaeological monographs. Two out of these relate to the Parthenon marbles. Dr. Bruno Sauer, to whom we owe so much as to the exact position of the pediment figures, publishes two recently-discovered fragments, both of which are now in the Acropolis Museum. One is a female figure from the nineteenth metope, on the south side of the temple, easily identified by comparison with Carrey's drawings. It is the finest draped figure that remains from the metope series. The second fragment is that of a colossal female head, of pentelic marble. It bears clear marks of having been fastened behind, and Dr. Sauer attributes it to the east pediment. So very little remains to us of the centre group, that the smallest contributions must be thankfully received. Of the six figures which Dr. Sauer's previous investigations on the attachment marks prove to have occupied the centre of the pediment, we have only three actual fragments remaining, the torso of a male figure, the present fragment of a head, and a female hand carrying the remains of a torch. The head bears obvious traces of having worn a metal crown and a veil, and to be brief, Dr. Sauer inclines to think it belongs to a seated Hera on the right side of the composition. The second paper on the Parthenon is by Professor Michaelis, and deals with the still vexed question of the central group of the eastern portion of the frieze. The old interpretation, *i.e.*, that this slab represented the offering of the Panathenaic peplos, has of late years been discredited in favour of the newer hypothesis that the scene represented is a priest laying aside his himation, which he gives to an attendant boy. We may note

* We are not saying this as any defence of the special case of the Bath competition, which seems to us to be thoroughly bad; we are considering only the general principle.

that the British Museum authorities, Sir Charles Newton, and later Mr. A. S. Murray, have always adhered to the older interpretation. Professor Michaelis hopes to set the question at rest by a very simple observation. The priest, he holds, *has* given the boy his himation, but it is not the carefully-folded object that is being passed from hand to hand. That is the peplos. But the boy has already over his shoulder a long heavy himation, and as this is considered inappropriate to his youth and position, it must, according to Professor Michaelis, belong to the priest. He had not two cloaks to part with, so the large folded one must be (*i.e.*, if the boy may not have a cloak of his own) the peplos itself.

A MOST interesting article is communicated by Mr. C. Davison, the well-known seismologist, to this month's *Geological Magazine*, dealing with the results of observations and experiments on the fluctuations in the level and rate of movement of ground-water on the Wisconsin Agricultural Experiment Station Farm, and at Whitewater, Wisconsin. These results are of more than local interest as leading up to certain general principles concerning the rise and fall of underground water. The experiments were made in fifty-four wells sunk for the purpose. A simple recording instrument was employed in each, consisting of a copper float connected with the short arm of a lever, the long arm of which carried a pen which, on a scale three times the natural size, traced the fluctuations in the water-level on paper moved by clockwork. By this means the slightest movement was detected. Summarising the results, we may say that as a general tendency the water-level stood highest under the highest ground, but there were certain exceptions to this rule after prolonged drought followed by heavy rains. This observation is not new, though it serves as a general confirmation of the works of others. The rate at which the ground-water rose and fell varied between rather wide limits, but, speaking generally, a given rise occupied a much shorter time than the same fall. After a fall of rain it was ascertained that the rise of the ground-water took place almost immediately in the shallow wells, but two or three days were required before the level was affected in the deeper ones. The experiments also showed—and this seems to us to be the most important conclusion—that the rate at which the water-level falls is much greater when the barometer is rising than when it is falling. During the three years 1888-90 the mean daily fall was 0.224 in. with a rising, and 0.001 in. with a falling barometer. Moreover, the water-level fell more rapidly during the day than during the night, the average fall for a number of wells being 8.583 in. per 1,000 day-hours (6 a.m. to 6 p.m.) and 1.309 in. per 1,000 night-hours (6 p.m. to 6 a.m.). It need hardly be mentioned, in face of the foregoing, that a rise in the barometer is also associated with a diminution in the rate of flow of water from tile-drains, springs, and artesian wells. We cannot enter into the discussion as to the causes of these phenomena, but they are of the highest interest to the student of certain water-supply questions; and we trust that the work so ably carried out by Professor King at the American Experiment Station alluded to, will be continued for some years to come. It cannot fail to shed much light on the flow of underground-waters, a subject still very imperfectly understood, in spite of the researches of the Committee of the British Association appointed to inquire into the matter.

THE case of Martin v. Price, decided on Tuesday by the Court of Appeal, shows the expense to which parties may be put by a judge who with well-meaning zeal tries to conclude a dispute by a short cut. The plaintiff proved before Mr. Justice Kekewich

that his ancient light had already been partially diminished by the defendant's new buildings, and would be still further lessened as the latter grew higher. The Judge took the bull by the horns, and awarded the plaintiff 120*l.* for damages, past and prospective. As the Court of Appeal pointed out, it is a matter of doubt whether a legal tribunal can properly give damages for a prospective injury. In truth, it is difficult, if not impossible, to assess them. The Court of Appeal, therefore, allowed the appeal, granted an injunction to prevent the defendant from further obscuring the plaintiff's light, and ordered an inquiry before an official referee as to the amount of the damages already sustained. If Mr. Justice Kekewich had adopted the same course, which is the usual one, he would have prevented the costs of an appeal, and have done justice in the ordinary way. To give a rough-and-ready decision such as he did is all very well for an arbitrator against whose decision there can be no appeal, but is very unwise on the part of a Judge, unless the parties consent to abide by such a decision in order to prevent further litigation.

THE Railway Reform Association, and other bodies who insist upon the necessity for wholesale reductions in railway rates, will not derive much encouragement from the perusal of the current half-year's traffic returns. Of course, these are not yet complete, but a most gloomy outlook is presented by the figures for the five months ending December 3. The following decreases in gross receipts are shown—

Great Eastern	£. 157,072
Great Western	210,749
Great Northern	250,644
Manchester, Sheffield, & Lincolnshire	255,036
London and North-Western	435,916
Midland	820,649

This is truly a most disastrous state of affairs, for it is certain that working expenses have not decreased in anything like the same degree. Various public bodies have passed resolutions urging reductions in rates, the Association we have already alluded to declaring their conviction that unless the railway rates for coal are materially reduced, "another and still more disastrous lock-out in the inland colliery districts is inevitable." Railway directors and officials, in common with coal owners and manufacturers, will have to direct their attention to regaining lost trade; but it is hardly likely that they will be prepared to make any very substantial reductions in their charges in order to effect this. A contemporary states that in a town within fifty miles of London, with a population of 150,000, the local gas company has made a contract with a firm in Belgium for the supply of coal for twelve months; and this may be taken as a specimen of the natural results of such suicidal struggles as the late coal war. These things should have great weight in determining the attitude of the members of the new Conciliation Board towards the questions with which they will have to deal.

THE Report to the Local Government Board by Mr. Evan Evans on the sanitary condition of the town of Amlwch, and on prevalence of "fever" there, tells the usual story in such cases in regard to water-supply, drainage, and disposal of refuse. As to water-supply we read that the town is almost entirely dependent for its supply of water on shallow dip-wells, situated on the outskirts of the town, so that water for drinking purposes has often to be conveyed in buckets and carts a distance of a quarter of a mile or more to the dwelling. From their situation these dip-wells are fairly removed from the danger of becoming specifically contaminated with the drainage of yards, middens, and privies, and the well-waters therefore, if properly protected, would be of good quality. But there is utter disregard of the most elementary precautions

in this respect. The wells are merely dry-stained, and are unprotected against surface washings; moreover they are uncovered and are often freely resorted to by animals. In regard to sewerage we read that, with the exception of some private drains which empty into the Afon Wen (out of which river water is taken for drinking to a certain extent), the only attempt at sewerage the town has been in connexion with a number of houses around the Castle Hotel. The only other sewer of any importance drains a few houses in Dinorben-square and the vicinity, and empties itself into the Afon Goch near the bridge. Occasionally small rubble drains are placed in the yards, and, passing underneath the houses, discharge on to the street in front, but, on account of the nuisance resulting therefrom, owing to the absence of roadside channels, they are mostly purposely blocked up, the slop water which used to be discharged into them being thrown into the garden, on to the refuse heap, or over the wall into an adjoining field. It is in regard to excrement disposal that, as usual, we find the tale worst:—

"In the houses which are provided with means of drainage, water-closets are often found; but their soil-pipes are generally unventilated, while the closets themselves are sometimes placed in improper positions. In one instance a hand-flushed and untrapped long hopper-closet was found placed in a small unventilated recess leading out of a bed-room, the soil-pipe discharging under a grating in a urinal outside. The usual method of excrement disposal, however, is by means of privies, which are almost invariably in a filthy condition and often dilapidated, while their contents are often allowed to accumulate for a year or more before removal. For many of the smaller cottages there is not even an apology for a privy, and the male inhabitants have to resort to the fields, while the excreta of the old and infirm and of the women and children are passed into pails, and have to be thrown on the refuse heap or into the neighbouring brook. These conditions are common throughout the whole town, and many were the complaints concerning this want of privy accommodation. The Rural Sanitary Authority do not undertake the removal of house refuse, which, in the common absence of ashbins and ashpits, is mostly piled up in the garden or against the walls of the dwelling."

We observe the same conditions exist in every rural district where the Sanitary Authority does not undertake the removal of the contents of privies. The people, if left to themselves, have not apparently spirit or sense to attend to this. It ought to be made legally compulsory on Rural Sanitary Authorities to undertake it.

THE BISHOP OF LONDON has issued a Commission to consider the expediency of uniting the benefices of St. Michael, Bassishaw, and St. Lawrence, Jewry, to which latter is already joined St. Mary Magdalen, Milk-street. Of the former church we gave a short description in a "Note" on March 4 last, when a faculty had been granted for removal of the remains beneath the floor. At a subsequent sitting (June 5) of the Consistory Court, the Chancellor of London made an order to suspend the excavations, which, it was found, could not be continued with safety to the fabric in its present condition. So the vestry passed a vote for union, since to place the structure in proper repair would cost about 5,500*l.*, to meet which a rate would fall upon some seventy or eighty parishioners. The church of St. Lawrence, designed by Wren, was built at a cost of 11,870*l.*, exceeding that of any other City church by him.* In the old church were buried Sir Richard Gresham (1549); and, according to Timbs's "Curiosities of London," Anne Boleyn's father, Thomas, the Earl of Wiltshire and Ormonde, and Richard Rich, mercer (1469), ancestor of the Earls of Warwick. Stow and Weever mention the interment of Geoffrey Boleyn (grandfather of Sir Thomas Boleyn), who was elected Lord Mayor in 1457; the Haliday monument commemorates William Haliday's widow Susannah, who married Robert

* St. Mary-le-Bow, Cheapside, cost 8,072*l.*, the steeple a further sum of 7,198*l.*

Earl of Warwick. The late George Godwin, in his "Churches of London," commends the east end, in King-street, of Wren's fabric; he writes: "The details of this façade are boldly designed, and display a purity of feeling almost Grecian." Its interior was adorned and rearranged in 1867, under the direction of Sir Arthur Blomfield; a few years later, Messrs. Gray & Davison fitted an entirely new interior to the organ, by Harris, 1627; the case is said (as also the pulpit sounding-board) to be by Gibbons. Tillotson, Archbishop of Canterbury, was married and buried here; he had been Tuesday Lecturer when Wilkins, Bishop of Chester, the mathematician, was rector. There are several windows by Cox, Clayton & Bell, and Heaton and Butler; Thornhill painted the vestry ceiling.

BY a Bill to be promoted next Session, the Manchester, Sheffield, and Lincolnshire Railway propose to acquire a plot of ground, about four acres, on the south side of St. John's Wood-road. It is the site of the Red Hand Farm, or Barn, which is marked by name on Cross's map of 1836, by which time, however, the avenue of trees, known as the Grove, leading from Lisson Green to the Barn, had been cut down. Seventy years ago Edwin Landseer lived with his father at No. 83, Queen Anne-street East, since Foley-street, a street in which Richard Cumberland, Malone, and Fuseli had resided. At that time Landseer tenanted a studio in Southampton, formerly Upper Conway, street, Fitzroy-square. He then took a small house, being part of the Red Hand Farm, and there he ultimately settled, converting the premises for his own requirements, and passed the latter forty-five years of his life. The present house, No. 18, of two stories, and built in the Italian style, of brick, stuccoed, has grounds covering two acres, and stands next west of the Female Orphans' Home, Grove-road.

IT is announced that the house which was Handel's birthplace is offered for sale. The house—wherein Handel's spinet, a clavichord, was discovered—is now No. 6, in the Nicolai-strasse, on the large Schlämm, at Halle-on-Saale, and stands in the midst of extensive grounds. The buildings are stated to be in good condition, having been repaired and decorated, with due regard for the older portions, at the two-hundredth anniversary jubilee of the composer. We understand that the Incorporated Society of Musicians, whose annual congress will shortly be held, have undertaken to place tablets upon houses in London wherein certain eminent composers died.

THE latest addition to the numerous playhouses of Vienna is the new Raimund Theatre, which has been erected in the Mariabühl district, and is intended for the representation of Classical drama at popular prices. Its auditorium, which measures 22 metres by 20 metres, or 72 ft. by 65 ft., holds an audience of about 1,800, half of which number have seats on the floor of the house. The cost of the building, for which Herr F. Roth acted as architect, was 450,000 florins, or 37,500*l.* Only nine months were required for its erection. Referring to the financial aspect of this "people's theatre," our contemporary the *Deutsche Bauzeitung* publishes some interesting data on the cost per seat of the largest theatres of the Continent. A seat in the Paris Opera House cost 16,466 francs, or 658*l.*; in the Vienna Opera House, 2,000 florins, or 166*l.*; in the Budapest Opera House, 2,525 florins, or 210*l.*; and in the Frankfurt Opera House, 2,356 marks, or 117*l.* The seats at the Schwerin Theatre cost 125*l.* each; at the Bruenn Theatre, 35*l.*; at Rouen the figure was 40*l.*; and in Halle and Berlin 49*l.* and 60*l.* respectively. At the Worms People's Theatre the cost was,

however, reduced to 25/ 15s. per seat, and at the new Raimund Theatre to about 21/ 5s. English figures are, unfortunately, difficult to obtain.

WE have received a copy of a report to the Vestry of Chelsea by their Surveyor, Mr. Higgins, in regard to the neglect of the London County Council to put up ventilating shafts in connexion with the low-level sewer at Chelsea. It appears that the Clerk to the County Council, in a letter to the Vestry dated November 23, rather rashly committed himself to the opinion that "a little persuasion is all that is occasionally required to have pipes erected, at the Council's expense, against the fronts or sides of adjacent houses," for ventilating sewers. Ever since the Council have been in office the Vestry have urged on them the ventilation of the sewer in question, and called their attention to the "poisonous smells" arising from the Council's main sewer ventilators at the western end of Cheyne-walk; and in September, 1890, Mr. Higgins wrote to the Council to say that he had obtained four consents for fixing ventilating shafts, and that there were two other possible positions on sites belonging to the Council, so that six ventilators were thus provided for. In November of the same year the attention of the Council was called to the matter again, and they were asked when the shafts would be proceeded with. In reply, the Council informed the Vestry that they had instructed their Engineer to try three shafts, not at the places where consents had been obtained, but along the footway of the Embankment and Cheyne-walk. These shafts have not yet been constructed. In April, 1891, the attention of the Council was again called to complaints of smells from the Embankment and Cheyne-walk sewers, and in May, 1891, the Council replied that its efforts in the matter of sewer ventilation would be greatly assisted if vestries would arrange with persons about to construct new sewers to make provision for their ventilation by means of shafts. In December, 1891, the Vestry again intimated to the Council the necessity for ventilating the low level sewer, and suggested that, when certain land was let, the Council should make a condition that the lessees should allow ventilating shafts to be fixed alongside the new houses. They consented to this, and, in February, 1892, when the land was advertised for sale, one of the conditions provided for a ventilating shaft, which was to ventilate the wrong sewer! Fortunately, the Vestry discovered this error, and communicated with the Council, and at the sale a fresh clause was inserted, containing the necessary provision for ventilating the low level sewer. Since February, 1892, no further action has been taken by the Council, nor have any houses been erected on the Beaufort-street site in question. It appears further that all the consents for ventilating-shafts which have been obtained, have been obtained by the Vestry and not by the County Council, in spite of their belief in their powers of "persuasion," and they are accused of having ignored the consents obtained by the Vestry, and that even when the owner of new premises has gone to the trouble of erecting a shaft they have been unable to utilise it, though they have subsequently put on record their opinion that "only a little persuasion is needed," &c. These bitter words have been forwarded to the County Council, who seem at all events to need a good deal of "persuasion" themselves before they can be induced to take action.

THE ELECTRIC LIGHT AT CHATSWORTH.—The electric light has just been supplied to Chatsworth House, the Duke of Devonshire's Derbyshire residence. The work has been designed and carried out by Mr. Bernard Drake, of the firm of Drake & Gorham, 66, Victoria-street, Westminster.

ERRATUM.—In the note on the shrine of Asclepius, page 445 *ante*, the words "17 in. length," &c., should have been "17 metres."

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE third ordinary general meeting of this Institute for the present session was held on Monday evening last, Mr. J. Macvicar Anderson, President, in the chair.

The minutes of the previous meeting having been confirmed,

The President announced that 70 persons, of whom 22 were relegated from previous occasions, had applied for admission to the Examination qualifying for candidature as Associate, and that 59 had been admitted. Two of these did not attend, 51 were examined in London, and 27 passed; 6 were examined in Manchester, and 4 passed. Of the 24 in London who were unsuccessful 6 were relegated in all subjects of the examination, and 18 in certain subjects; of the remaining 2 in Manchester, 1 was relegated in all subjects, the other in certain subjects. The names of the 31 successful candidates were as follows:—William Henry Ashford, Rhyader; Roger Francis Bacon, Reading; William Tillott Barlow, 23, Finsbury-circus, E.C.; Harry Barnes, Sunderland; Ernest Robert Barrow, 76, Mount-street, W.; Alfred Kirk Brown, Preston, Hull; William John Childs, Putney Bridge-road, S.W.; Henry Dearden, Basing, Yorkshire; John Robert Earnshaw, Manchester; Ernest Edward Fetch, East Dulwich, S.E.; Arthur James Forge, Woodford, Essex; Francis Peter Halsall, Southport; Charles Spencer Haywood, Accrington; Harry Evan Jones, Dalston, N.E.; Charles Kempton, Leicester; Franklin Kaye Kendall, Blackheath; Harold Clapham Lander, Tunbridge Wells; William Arthur Lewis, Walthamstow; Frank Lishman, Clapham Common, S.W.; John Renison Little, Bolton; John Archibald Lucas, Exeter; Arthur Hill Morgan, Chester; John Ernest Mowlem, 13, Osnaburgh Street, N.W.; John Newnham, 61, Palace Gardens-terrace, W.; George Ernest Nield, Tottenham; Douglas George Salier, 11, Spring-gardens, S.W.; Arthur William Sheppard, Tulse Hill, S.W.; David Forbes Smith, Kirkcaldy; Alfred Wright Toynott, 23, Duke-street Chambers, Bloomsbury, W.C.; George Harry Male Trew, Lavender-Hill, S.W.; Edward Box Wetenhall, Finsbury Park, N.

The President also announced that the Council had, on the recommendation of the Board of Examiners, awarded the Aschpiet prize for the present year (which, as they were aware, was given to the candidate who most highly distinguished himself in the examinations throughout the year) to Mr. Ernest Robert Barrow, and they had awarded an additional prize of books, of the value of five guineas, to Mr. Ernest Edward Fetch and to Mr. John Alexander Russell Inglis.

The President also said that he regretted to intimate that Mr. William Simpson was unable to be present to read his paper. Mr. White, the Secretary, had, however, consented to read the paper, the subject of which was "The Classical Influence on the Architecture of the Indus Region and Afghanistan."

The Secretary, at the outset, explained that the paper had been written by Mr. Simpson some months ago, and was due to a piece of work which he possessed in his own house on his mantelpiece (a photograph of which was handed to the members for inspection). This was a piece of Indian sculpture, showing portions of temples, &c., containing details which must have been derived from a classic source. It was natural to suppose that the Greeks who followed Alexander, had been the means of introducing Greek detail into India; that Greek architects had come to Bactria, during the time when the Satraps, after Alexander, ruled at Balkh. It was suggested that these architects practised in that region, until the Greek style had been more or less established; that it afterwards crossed the Hindoo Kush and attained more or less to the Indus, becoming in the process mixed with native features of construction, and thus producing that peculiar jumble of forms with which we were now familiar. As almost all the remains in which this Greek influence had been discovered were Buddhist, Dr. Leitner called it Greco-Buddhist; Sir Alexander Cunningham at first called it Aryan*; at a later date he called it Indo-Grecian. Fergusson suggested that it might be classed as Indo-Roman, or even Indo-Byzantine. The term classical had been employed in this paper to avoid any assumption as to the source of the influence. Mr. Simpson then gave a slight

sketch of the history of the discovery of this classical influence in India. The first hint of it he had met with was given by Mountstuart Elphinstone in 1809. Among the first to realise distinctly, however, the classic character of much of the work in the Indus region was Sir Alexander Cunningham, who, in 1838, published a work on ancient remains in Kashmir, where classic influence could also be traced; but the extent of this classic influence was not realised till the exploration of the Peshawar Valley. On his (Mr. Simpson's) first visit to India the conclusion was forced upon him that such an influence could be traced on the details of the monuments. He had still a sketch made at that time of a capital, which seemed to him conclusive on the point. Visiting Kashmir in the following year he also noticed the classic character of the details, which confirmed his previous convictions. It was about 1870 that Dr. Leitner made excavations in the Peshawar Valley which resulted in the discovery of a considerable number of sculptures. It was to these, which were exhibited for some time at South Kensington, that Dr. Leitner gave the name of Greco-Buddhist. As to the geographical distribution of these semi-classical monuments, there were but a few in the Punjab, between the rivers Indus and Jhelum. The temples in Kashmir were almost all Brahminical, but in those he had seen the classic influence could be traced on many of the details. The locality which had produced most of the sculpture was the Peshawar Valley. The influence was also to be traced in Buddhist remains in Afghanistan, but there were considerable districts in which no remains had been reported, probably because they had not been looked for. Their first knowledge of the remains in Afghanistan was due to Mr. Masson, but his acquaintance with architecture was not sufficient to enable him to observe the classical influence, and his drawings were so small that the peculiarities of detail could not be distinguished in them. In 1878 he (Mr. Simpson) made sketches of the remains of Buddhist architecture and of its details in such a manner as to convey its character, and these left no doubt about the existence of the classical influence upon them. He could not speak of the Kabul Valley from his own observations, but there were drawings by Mr. Masson, and from these he presumed that the style in both cases was the same. In Kashmir and the Salt Range there were still remaining a few temples with columns which had been described as Doric; but if the Corinthian and Ionic forms had not been recognised in this region he doubted if anyone would have given the title Doric to these. The absence of the frieze and architrave peculiar to the Doric order might be accounted for by the fragmentary manner in which the originals were copied. Alexander's stay in the Punjab was too short to leave any permanent impression. The date of Alexander's invasion was also, he thought, too early, it being generally accepted that the remains they were considering belonged principally to the first centuries of the Christian era. The theory held up to the present had been that this classic influence originated from Bactria, where a Greek Government was established, with Balkh as its capital. A large and important city, which was the seat of government, would no doubt attract artists who would remain permanently. They had evidence that Greek artists—or at least artists familiar with Greek art—did exist in Bactria; the coins of the early rulers afforded evidence of this. There might also have been others who were architects and builders as well as sculptors. This Bactrian dynasty appeared to have lasted a century and a half when it was swept out of existence, but 150 years would be quite sufficient time for the introduction of new forms in architecture and sculpture. Being once established the supposition was that the style in course of time found its way to Afghanistan, and passed on to the Indus. At the first view of the subject the Greek origin of the details was assumed, but later on doubts arose, and for some time past the question had been—Is the influence Greek or Roman? When he had written before upon this subject he accepted, after consideration, the theory that it was Greek, and used that word along with the word "classical." In the present paper he had adopted the term "classical," but the aim of the paper would be to show that the influence was Roman and not Greek. He would add some slight evidence which would go to show that this former conclusion, which had been generally accepted, and which even Fergusson supported, was very doubtful. This might be seen in details which pointed to Palmyra as the source from which the classical influence came to the north of India, and that when it reached the

* Not "Aryan," as spelt in the Institute Transactions! The Aryans were a sect of heretics in the fourth century, A.D.

Indus it went from that region into Afghanistan, and probably it never crossed the Koh-i-baba range into the Valley of the Oxus. Perhaps he could not do better than relate the circumstances which had led him to this conclusion. In the winter of 1884-85, when he accompanied the Afghan Boundary Commission, he kept a very watchful eye upon the architectural monuments. The fluted column, the sculptured frieze, or the Corinthian column, would have been welcome to his sketch-book. But he only saw mounds of various sizes where cities had been at different times. They seemed to contain nothing but fragments of pottery, and at times large square bricks could be seen scattered about. His own impression was that these mounds were the remains of towns constructed like those seen in the present day, which were nearly all built of mud or sun-dried bricks. Not the slightest trace of anything classical was visible. Some caves were discovered, but they were also free from the touch of anything that had Greek or Roman origin. When he returned home, Major Talbot, of the Royal Engineers, was sent on an expedition to survey eastward through the Koh-i-baba range. He sent him a number of drawings and descriptions of these caves, as well as of others at Hissak. In the expedition there was a young Brahman. He made a sketch of the great statue at Bamian. This sketch was sent home to him, and he was astonished to find that there was no appearance of Greek or classical influence upon it. If Balkh was the centre from which the classical influence started and found its way to the Indus region, then Bamian was just the spot where it might be expected to be found; on the contrary, the statues seemed to be entirely free from that influence. The details of these caves had been accepted as Sassanian, with nothing either Greek or Roman in them. On his mantelpiece he had a very fine piece of sculpture found at Hadda, near Jellalabad, which contained some of the main features of classical architecture. It would be seen from the photograph that there were pilasters with quasi-Corinthian capitals, and it might also be noticed that on each of these pilasters a panel was represented. This panel was the first point he took up when asking, were there panels in Greek pilasters? He could find none. He consulted Professor Hayter Lewis on the subject, and he confirmed his conclusion. Another point was the absence of fluted columns, and a third, that there were no modillions in the Greek Ionic, and Corinthian orders. It had already been shown that there was a strong probability that the classical influence did not come by way of Bactria. They must, therefore, look for a trade route. There was the Egyptian route by which 120 ships sailed down the Red Sea every year in connexion with the commerce of Rome; but these vessels seemed to have gone to the coast of Ceylon, so that that route would not supply what was wanted. The presumption would naturally be in favour of the other route, by the Persian Gulf, but they required a much later date than the time when the Phœnicians traded in the Persian Gulf. Possibly it might have been the descendants of those people who developed the trade of India through Palmyra. Here they had a trade route at a date near enough for their purpose. The trade lasted up to the year 272 A.D. There they knew there were examples of Roman architecture, and these examples were, he thought, the nearest in point of situation to India of any that they knew of. In the Roman architecture of Palmyra they found almost all the architectural features of the sculptures in the Indus region and Afghanistan. The Corinthian order predominated. Beyond the reference already made to the absence of the classical influence in the great statues of Bamian he did not propose to touch upon the figure subjects of the sculptures, nor the coins, although he recognized their great importance. One obvious reason for silence on his part was that his want of knowledge did not entitle him to speak on this branch of the subject.

The Secretary then read two communications received from Dr. Burgess, formerly the Director-General of the Archaeological Survey of India, and Professor T. Hayter Lewis. Dr. Burgess, writing from Edinburgh, stated that Mr. Simpson's paper was an eminently clear statement of the question of classical influence on the architecture of the North-West of India and Afghanistan—a question on which the last word had perhaps not been spoken. Whether the influence traceable in the remains was to be called Roman or Greek was a matter of subordinate importance, dependent chiefly on the source to which we directly traced

the influence and the period at which it was felt. Roman was here only a later form of Greek art. In the first formation of hypotheses, we were apt to assume more than was necessary. The theory that if Greek die-sinkers found their way to Bactria there might also have been others who were architects or builders, as well as sculptors, was uncalled for. In those early times the artist was sculptor, architect and engraver in one. Nor need they suppose that because no remains had yet been reported from beyond Bamian of a similar type to those of Gandhara, that none existed. Remains of the sort were usually found in certain limited areas. Nor should they make out the hypothesis that Balkh was only the capital or mint city of most of the princes. Under these principles there seemed no sufficient argument for concluding that their artists did not influence the art of the region over which they ruled. Whether that influence had been fully developed long before the execution of the special group of monuments under construction, or whether it took hold of the art just about the time of their construction, might not be clear yet. From what Mr. Simpson said it was evident that no conscious effort was made to mould the forms under classical influence.

The President, previous to inviting discussion, read part of a letter received from Mr. Simpson, in which he said his first connexion with this peculiar architecture dated as far back as 1860. Since then he had seen and sketched monuments in which the influence existed in Kashmir and Afghanistan. The paper, he believed, was about the first in which there was an attempt made to analyse the details of this architecture, and he had all but avoided the sculpture with the view to determine whether it came from a Greek or a Roman source. The style itself was such a peculiar mixture of forms, the Classical details were so debased and so arranged in their parts, that to call it either Greek or Roman architecture might seem a doubtful use of words. This he was perfectly aware of, but there was no doubt of the existence of the influence through some source, and it was that source that had to be determined.

Mr. Purdon Clarke said that, having in 1870 and 1871 been stationed in Rome engaged upon the superintendence of the reproduction of Early Christian works of art, he formed a pretty good mental impression of the leading characteristics of Roman art, and especially of that of the later period. Ten years afterwards, when in India at the Lahore Museum, Mr. Kipling showed him a collection from Takht-i-bhai. His first impression was—and it had remained a very strong one ever since—that in some way these so-called Græco-Buddhist sculptures were connected more with Roman than with Grecian art. In reference to the statue before them he had very little doubt that it was intended for Minerva. It looked very much like a work of Roman art, and on two or three of the casts there would be found figures which were very much like Roman soldiers in the costumes of Roman soldiers of the fourth century. In Cashmere the buildings were pretty well known. Some of them, however, had escaped observation. In an island in the lake at Shinugger there were foundations of a building of very classical details, which, as far as he was aware, had never been drawn. Half-way between Palmyra and India on the old trade route, and not far from the city where Queen Esther was buried there was the remains of a Greek temple still standing—a building which had never been well explored. He did not think any of the columns carried their capitals. They had been destroyed by fire, and huts had been built all round them, but in several places they could trace them through the buildings. There was no doubt that there was a perfectly-formed temple of the first class, and its plan had been traced by M. Flaminio to be equal in size to the Temple of the Sun at Palmyra. Quantities of Greek and other coins had been found there.

Mr. Leonard remarked that he could not say a single word which would be of use in settling the question whether Greek or Roman influence was at work among these buildings in the North of India and Kashmir. When he was at Lahore it was looked upon as quite an established thing that it was Greek influence. The ordinary class of people looked upon the sculptures and the remains in the Lahore Museum as having been influenced by Greek art, and in Kashmir the same theory prevailed, although he thought the Kashmir buildings were much more Roman than Greek in style. He did not think that Mr. Simpson had quite established his point that it was Roman and not Greek influence that had been at work. It was very likely that Greek

influence was the prevailing influence at work there.

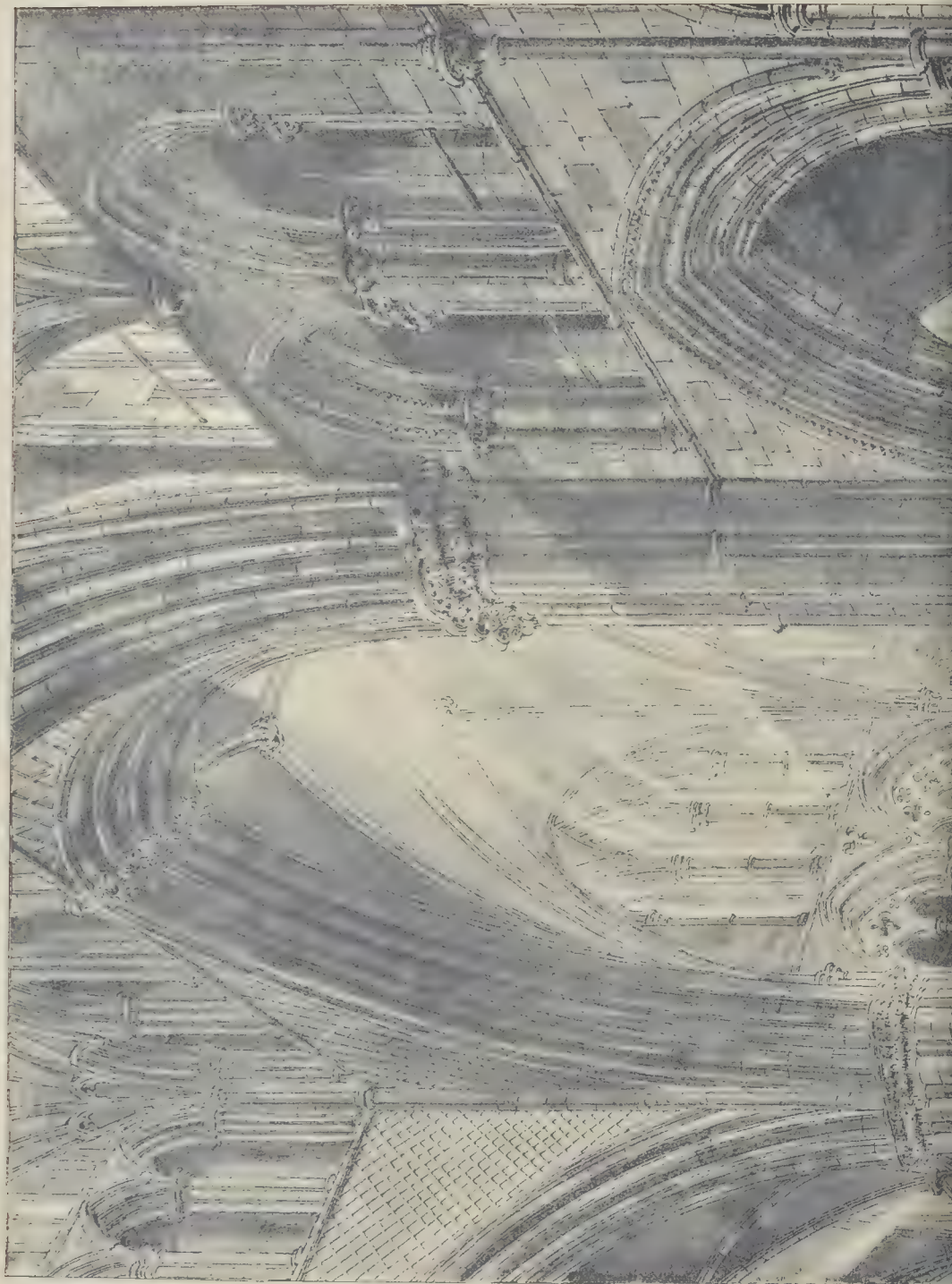
Mr. Tavenor Perry asked if he might enlarge on the theory suggested by Mr. Simpson, the farther east they went the richer they found the so-called Corinthian style. The farthest east they went was, he thought, Palmyra, and there they came into the great break of Persia, due, no doubt, to the revolution in Persia which stamped out the Greek influence at a later period. But they found in Palmyra and westwards again the richest examples of Corinthian architecture on the face of the globe. Was it not possible that this was the result of Eastern influence upon Western art rather than Western influence upon Eastern art?

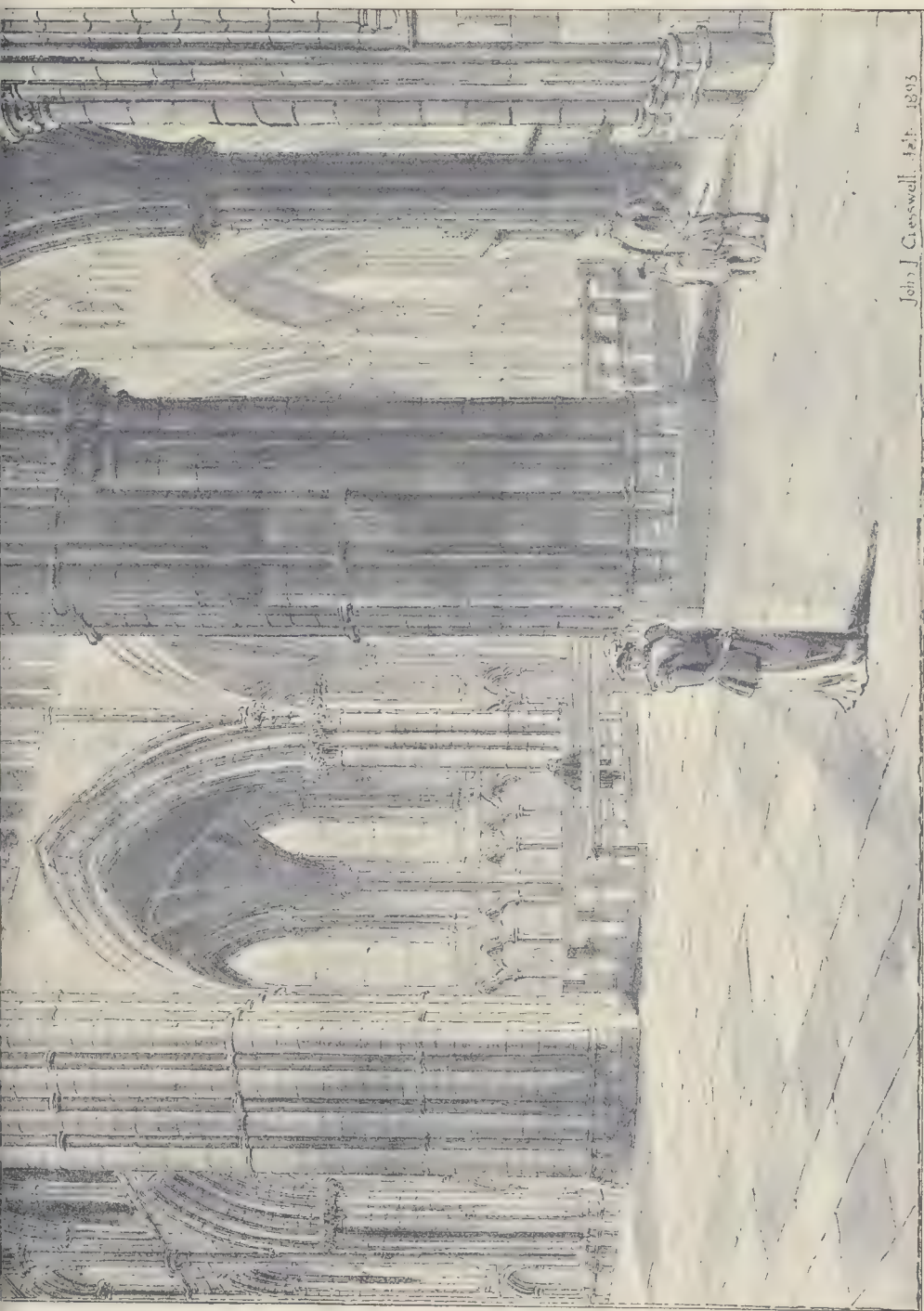
Mr. Loftus Brock, referring to the collection of examples at the Oriental Institute, said they appeared to have more of Greek influence than that of Roman, but there were some examples which, like the one Mr. Simpson called his mantel-piece portion of sculpture, certainly represented a great deal of Palmyrian influence, but his impression was that the buildings of Palmyra did not all date from the time of Hadrian. The bulk, he took it, were much later; but, be this as it may, he thought their best course in a study so interesting as this would be to collect examples before they dogmatised. It was far more easy to say that there was influence from Europe in these countries in the East than it was to determine whether that influence was Greek or Roman; and the subject being so much in its infancy he thought they had hardly enough data to enable them to determine. The examples at Woking were not only architectural features, but they were examples of sculpture, and certainly sculpture which appeared to be far more Greek in character than the architecture. It might be that the architectural features were more in smaller detail than in any piece of an actually completed building. From the fact that there were so many coins in India which indicated Greek influence it really seemed no more difficult to believe that Greek artists designed the coins than that Greek artists were at work among the other artists. With regard to Palmyra, he might say that the influence of Palmyra was entirely that of a trading city. It existed not only in the time of Hadrian, but for hundreds of years, it might be, before Hadrian, so that whatever influence there might have been in Roman times was but the counterpart which might have proceeded for a long period when Greek influence would be paramount.

Mr. William White, F.S.A., said he had followed with great interest the account which had been given in the paper, and it would be rather presumptuous in him to draw any conclusion as to whether it were rather a Greek than a Roman influence which had predominated. From what had been said, it seemed to him that it was very possible that there had been an early Greek influence, and a subsequent one from the Roman, met with perhaps some centuries later. He gathered that from what had been said by several of the speakers, and not from the details themselves. He wished to ask if any one could give any account of the photograph which had been handed round, because it seemed to be a conglomeration of various styles—Greek, Roman, Byzantine, and Gothic all piled together in one.

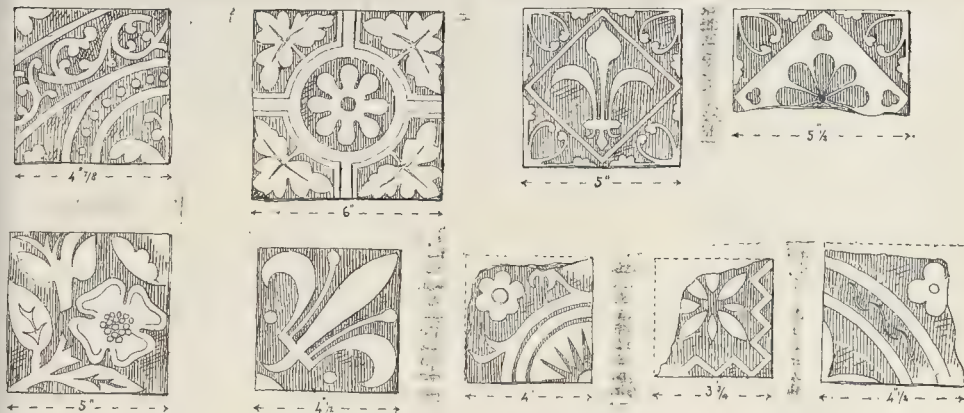
Mr. Ph. Spiers said his impression was that the influence had been not only Roman, but Greek, Persian, and Sassanian, and, finally, Byzantine. He was extremely sorry that Mr. Simpson was not present; but he was well acquainted with his (the speaker's) opinions, as he had already quoted many of Mr. Fergusson's views upon the subject. He (Mr. Spiers) quite agreed with what Mr. Fergusson had said on the subject. Of course, Mr. Simpson was acquainted with the theory that the influence referred to might possibly be due to the influence of the works of the lower empire, and in that way they would settle one difficulty which seemed to be hanging over them—it might be debased Roman and debased Greek as well. Mr. Simpson, by restricting himself to Palmyra, in which he said trade existed up to 273, confined his period to the second and third centuries. From a careful examination of photographs, and research into the developments of the Sassanian and Byzantine styles of architecture, he (Mr. Spiers) had come to the conclusion that the Buddhist sculptures had infinitely more connexion with those two later styles, and that in their character they differed widely from the Roman work at Palmyra. He (Mr. Spiers) could not accept Mr. Simpson's theories as regarded the date of the Bactrian work, seeing that it possessed features which could only be ascribed to a date as late as the fifth and seventh centuries, or even







LINCOLN CATHEDRAL VIEW IN NORTH WEST TRANSEPT FROM A DRAWING BY MR JOHN J. CRESSWELL, A.E.I.R.A.



Tiles Found at Winchcombe Abbey.

Mr. Simpson had pointed out that the arch, as shown, need not have had a Byzantine origin, because it was like the Chaitya arch of a Buddhist cave. It was not the arch alone, however, which decided the question; it was the loose assemblage of arches, and their support on Corinthian pilasters with wide-spreading capitals, which denoted, he ventured to think, their Byzantine origin. Arches carried on columns were not found in Palmyra, in the buildings in which Mr. Simpson took for his models, but they were adopted as the principal characteristics of the style in Byzantine buildings in the East and in Eastern Europe. The capitals of the pilasters were of two designs, which might be either Persian or Byzantine. Pointing to a photograph of two niches, he said they were of that symmetrical form which they found in the Sassanian buildings, but the whole photograph was a jumble of various forms. There were, however, two decorative details on which he mainly relied to show the later date of the work. One was Sassanian and the other Byzantine. The Sassanian detail was the moulding that ran round every one of these arches; and the second, the Byzantine, was the string course, which was a leaf decoration of the ogee moulding. He thought the subject was an extremely interesting one, and he ventured to suggest that Mr. Simpson should give his reply, which might be published along with any of the photographs. In conclusion he begged to propose a hearty vote of thanks to Mr. Simpson for the trouble he had taken in preparing the paper.

Mr. W. Emerson, in seconding the vote of thanks, said he would like to say that Mr. Tipling, who was there from Lahore but was unable to speak on account of his health, would be very pleased to give the members some remarks in their journal next month. Mr. Simpson, in his paper, seemed to endeavour to prove that the Greek influence from Bactria could not have penetrated into the Punjab and Central India, and therefore used that as a peg to hang his argument upon that Greek influence could have nothing to do with it. But Alexander, it is well known, crossed the Indus himself at a place called Attock, and not very far from that region, he believed, some time ago some engineers, in making a railway, discovered an ancient Greek burial-place. A report of this was given to the Director-General of the Archaeological Survey in India, and it was expected to appear in one of their books. This seemed to show that Greek influence was in the neighbourhood, at any rate. While he was at Lahore Museum he saw some of the sculptures. There was a large representation of Buddha, which gave him a very strong impression of Greek influence, certainly more Greek than Roman; and he thought the sculptures, in some cases, did show more Greek than Roman influence with regard to the folds in the drapery. They had taken a great deal of trouble to prove how this influence of Greece and Rome had affected the art and architecture in that part of India, but everything in the West had proceeded from the East. The East was the cradle of the religions and beliefs and the arts and architectures; in fact, it was also the cradle of the human race according to Scriptures. Was it not likely, at some of these types of arts which they were

trying to prove wholly originated from Greece—that the germ of them had been originated in these localities and started westward, and were there perfected by the Greeks and Romans, and perhaps came back again? He did not think they could find a specimen of ancient Indian architecture in which there were not numberless little details which were very closely similar to some details in Roman and Greek work. Might it not be, therefore, that the origin of these types really came from the East? With regard to the point mentioned that certain of these sculptures looked very like early Christian work, the Nestorians penetrated into both India and China. In China at the present moment there were remains of certain buildings which were known to be Nestorian. Was it not possible that they might have taken some suggestions of art into India at that time?

The President said that Mr. Simpson had supplied a very able and exhaustive paper—a paper displaying great research, and to which he had evidently devoted a great deal of time and thought—in order to demonstrate that the influence to be traced in the art of Central India was derived from Roman influence and not from Greek influence. Others were directly of an opposite opinion. He confessed that the impression left upon his mind was this—that it was unnecessary to attempt to prove that the influence was derived either from Greece or Rome. What Mr. Emerson had said appealed to his sympathies. He could not for the life of him see why they should not give some credit to the earlier Indian artists for some amount of originality.

The vote of thanks was then put to the meeting and agreed to unanimously. The proceedings then terminated.

TILES FOUND AT WINCHCOMBE ABBEY.

THESE are drawings of the designs on a few tiles which were come upon in the course of the recent excavations on the site of Winchcombe Abbey, described in our issue of October 28.

THE ARCHITECTURAL ASSOCIATION.

ON the 15th inst. a special general meeting of members of this Association was held to consider the question of the admission of ladies as members of the Architectural Association.

The President, Mr. E. W. Mountford, occupied the chair, and the following resolution was proposed:—"That in the opinion of this meeting ladies engaged in the study or practice of architecture are eligible for election on the same terms and under the same conditions as gentlemen."

Mr. H. O. Cresswell in opening the debate, pointed out that the object of the meeting was to bring the question before the general body, and give them an opportunity of discussing it.

In the discussion which followed, the following gentlemen supported the resolution:—Messrs. F. R. Farrow, B. F. Fletcher, and E. Woodthorpe. The following gentlemen spoke against the resolution:—Messrs. Cole A. Adams, W. H. Atkin Berry, H. N. Kerr, H. Lambert, S. Perks, and others.

The resolution was put by the President, when thirty-seven members voted in favour of the resolution, and seventy-eight against, several members not voting. The meeting then terminated.

THE SOCIETY OF ENGINEERS: ANNUAL DINNER.

THE Annual Dinner was given at the Holborn Restaurant on the 13th inst. The President, Mr. W. A. McIntosh Valon, J.P., occupied the chair, and amongst a large company present were Sir Robert Rawlinson, K.C.B. (Vice-President, Institution of Civil Engineers); Mr. W. H. White, C.B., F.R.S. (Director of Naval Construction to the Admiralty); Mr. W. Worby Beaumont, Mr. E. K. Blyth, Mr. H. J. Chaney, Mr. Geoffrey Drage, Mr. F. Fanta, Mr. R. C. Glen, Mr. W. A. Hubbard, Mr. Walter King, Mr. E. Lloyd Pease, Mr. J. Rexworthy, Dr. L. T. Thorne, Mr. W. H. Welber, Mr. H. O'Connor, Mr. W. Spon, Mr. G. A. Goodwin (President-elect), Mr. Henry Fajia and Mr. W. G. Peirce (Vice-Presidents); Mr. J. Bernays, Mr. Chas. Gandon, Mr. Perry F. Nursey, Professor Henry Robinson, Mr. A. T. Walmisley and Mr. J. W. Wilson, jun. (Past Presidents); Mr. S. H. Cox and Mr. G. M. Lawford (Members of Council); Mr. Alfred Williams (Hon. Secretary and Treasurer), Mr. Samuel Wood (Hon. Auditor), and Mr. G. A. Pryce Cuxson (Secretary).

The President gave the usual loyal and patriotic toasts.

Mr. W. H. White, C.B., F.R.S., in responding for the Navy, said that the shipbuilding and engineering resources of this country were matchless.

Sir Robert Rawlinson proposed the toast of the evening—"The Society of Engineers, the President, the Hon. Secretary and Treasurer, and the Secretary." In his boyhood, he said, such engineering as now existed was in its infancy. Railways had scarcely been commenced, gas-lighting, except in one or two places, was an unknown matter, and mercantile shipbuilding was on a very small scale. The changed circumstances had now opened up enormous fields to the younger members of the profession.

The President, in reply, said that during his year of office every member of the Council had endeavoured to promote the success of the Society by self-sacrifice and attention to their duties, and they were greatly indebted to their Hon. Secretary, Mr. Alfred Williams, as well as the active assistance of their excellent secretary, Mr. Pryce Cuxson. He further said that the prosperity of the Society had been assured for years past; in their lifetime of forty years, like other institutions or persons, they had their times of depression and anxiety, but today they stood in a more prosperous position financially and numerically than at any previous time in their history. He also remarked on the opportunities given to the younger engineers to visit works and learn from the great teacher "Observation." They were reminded in Lord Kelvin's recent Presidential address to the Royal Society, that the received facts of to-day are often the fictions of to-morrow, which proved the necessity for constant discussion of accepted theories as well as the strict examination of new ones. The President then referred to the hon. members of whom they had lost during the year, Dr. Frantz Grashof, Director des Vereins Deutscher Ingenieure, the Council having filled the vacant place by the election of Mr. W. H. White, C.B., F.R.S., Director of Naval Con.

struction to the Admiralty. In conclusion, he said that Sir Henry Bessemer, one of the hon. members, had for years given a donation, the value of which had been conferred as a premium to the reader of one of the papers during the year. He had now generously signified his intention of making arrangements for the presentation of the premium in perpetuity, and the Society lay under a deep obligation to him for his kind and generous act. Sir Robert Rawlinson had also agreed to give a premium for a paper, to be awarded at the direction of the Council.

Mr. Pryce Cusson also replied, and bore testimony to the thoroughness of the work done by the Council. At the same time, all that work would be useless unless done for something of real value, and the fact of the long and continued success of the Society, and its largely-increased membership during the last six years, showed that it supplied a real want.

Professor Robinson gave the toast of "Kindred Institutions," which was replied to by Mr. Binney (Engineer to the London County Council) and Mr. West, of Manchester.

The remaining toast was that of "The President-Elect, the Vice-Presidents, the Members of the Council, the Hon. Solicitors, and the Hon. Auditors."

BUILDERS' BENEVOLENT INSTITUTION: ELECTION OF PENSIONERS.

AN election of two pensioners on the funds of this Institution took place on the 14th inst., at the offices, 35, Southampton-row, Bloomsbury-square, W.C., Mr. George Haward Trollope (President) in the chair. There were two vacancies, for one man and one woman. At the conclusion of the poll, the scrutineers, Messrs. T. Stirling and E. S. Rider, declared the result to be as follows:—Alfred Clement, 115, Bedford-road, Brixton, builder, aged 73 (second application), 1,999 votes; Jack Taylor, 14, St. James's-road, Bermondsey, aged 62, master slater (second application), 1,348 votes; Sarah Elizabeth Drake, Tylers and Bricklayers Almshouses, Balls Pond, aged 63, widow of Francis Drake, builder (sixth application), 3,035 votes; Susannah Mansell, 20, Bridge-road, Hammersmith, aged 70, widow of William Mansell, builder (fifth application), 4,119 votes; Mary Ann Healing, 20, Curtain-road, Shoreditch, aged 63, widow of Samuel Thomas Healing, builder (fourth application), 312 votes; and Maria Elizabeth Powell, 28, Albany-road, Camberwell, widow of George Thomas Powell, late a pensioner of the Institution, and who subscribed to the charity for some years (first application), 700 votes. The successful candidates, therefore, are Alfred Clement and Susannah Mansell.

Votes of thanks were passed to the President, the scrutineers, and the check-takers, and the proceedings terminated.

THE PODEWIL SYSTEM OF TREATING FÆCAL MATTER.

THE Danish technical journal, the *Ingeniør*, the organ of the Copenhagen Society of Engineers, give recently an article on the Podewil system of treating fæcal matter, of which the following is a translation.

Proposals having been made to arrange for the treatment of the fæcal product in Copenhagen according to Von Podewil's system, it may be of interest briefly to describe the same, the more so as most of what has previously appeared on this subject—even as late as 1889, in Muspratt's "Technische Chemie"—is very inaccurate. But, on the other hand, it should be added that the system, or, more particularly, its details, has been steadily improved of late years; in fact the details have only been exactly settled since then. The principle of this system is that the fæcal matter is mixed with sulphuric acid, whereby a powder-like poudrette is obtained, in which all the valuable original substances are retained in a form easy of absorption by plants. The evaporation with sulphuric acid itself is not peculiar to this system alone, as similar processes are adopted with the Liernur system and at the former Hanover Poudrette Factory; but what is new with the Podewil system is that the process is much more simple, and the heat utilised so well that the production is a financial success, i.e., when the fæcal matter is obtained gratis. If the Von Podewil'sche Fæcal-Extract Fabrik, situated on the outskirts of Augsburg, be visited,

a clear idea is obtained of the experiments which have been made here, and of the manner in which the manufacture has been developed. The apparatus now in use stand tightly fixed side by side with Roberts's vacuum apparatus and drying cylinders of various construction, of which there are a lot of worn-out ones, too, in the yards. The entire factory is encircled with a network of pipes. Naturally, the old boilers are utilised as long as possible, but when these are worn out or a new factory is to be established in any town the *modus operandi* is as follows. Through iron bars, which retain larger objects, such as old boots, tins, bits of wood, &c., the barrels with the excrement are emptied into two reservoirs into which the sulphuric acid is ejected through pipes; the mixing is then effected. Hence the mass is drawn by suction into the so-called fæcal boilers, i.e., rotating cylinders of forged iron, embedded in brickwork, and directly acted upon by the fires, each from its own fireplace, and in which the burning of the acid latrine matter is obviated by the insertion therein of iron blocks or a network of pipes. The fæcal matter thus dried so far is next drawn by a similar operation into the drying cylinders, where the process is completed. The latter are rotating and double, and made of cast-iron, into the outer chamber of which the waste steam from the engine and the acid vapours from the fæcal boilers are conducted, whilst in the inner chamber the vapours developed from the fæcal product are drawn off and condensed by an injecting condenser, so that the evaporation here takes place in a vacuum. In these cylinders, too, lumping and adhesion of the mass to their sides have been obviated by the introduction of loose, heavy, iron chains. The final pulverisation and mixing of the product is effected by a disintegrator. It should be pointed out that even in close vicinity of the factory no bad smells are noticeable—not nearly so bad as, for instance, near a chicory factory or a maltery. The condensation water runs clear into a little stream, and is perfectly clean, almost free from odours. If a Podewil factory be compared with a poudrette factory on the Liernur, Buhl, or Keller system, the great simplicity of the arrangements and method in the former are strikingly apparent, whilst it has also the advantage of the last-mentioned system that *all* the plant feeling substances found in the raw material are equally found in the poudrette, partly in a form easier of assimilation. It may here be remarked that when it has been publicly stated that the evaporation of the latrine product with sulphuric acid causes a loss, thereby that a portion of the hydrogen in the same would be present in the form of acid of saltpetre, which would be ejected by the sulphuric acid, and thereby be lost, this theory is quite erroneous; for the raw latrine product does not contain acid of saltpetre; but, on the other hand, no inconsiderable quantities of ammonia, which become bound by the sulphuric acid, and just thereby preserved in the poudrette. That the evaporation with sulphuric acid causes a complete sterilisation of the fæcal matter is self-evident, and if only the removal of the barrels for holding it be effected in a careful manner, the poudrette manufacture by which the mixing of the sulphuric acid and the process of boiling are effected immediately after their emptying, affords the greatest possible guarantee in sanitary respects. The only system which might be said to offer greater protection is the water-closet system, but only when, in a city like Copenhagen, such closets were compulsory. Otherwise they would lose all importance. But there must, of course, in regard to the former systems, besides the important sanitary points, also be considered the economical ones, and it has been complained of the Podewil system that its introduction would be attended with increased expenditure for householders. But this objection has no foundation in fact, as when at a future time it will become necessary to demand a higher tax rate for the removal of the latrine barrels, this will be necessary in any case, whatever system be adopted; so when there shall be a reform of our "night renovation system" the municipal authorities will be obliged to demand various important improvements, such as a quicker clearing of the barrels, and most probably the adoption of closed steel barrels, and their regular and proper cleansing outside and inside, so that the rates for this work *must be raised in any case*. To conclude, the Podewil system must, all details considered, be said to be the best of its kind, i.e., the fæcal system which satisfies most satisfactorily the demands of hygiene, the householders, the agriculturists, inasmuch as it ensures a complete sterilisation of the latrine matter, and only costs the householders the removal, whilst at the same

time benefiting agriculture by producing a manure easy to handle and free from the objections to the raw material. In addition, it is delivered in a state in which it contains in volume six times as much plant nutrient as the fresh and untreated latrine product which farmers spread on their land, and which, through fermentation, has lost a great deal of its most valuable properties."

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring Gardens, Mr. John Hutton, the Chairman, presiding.

Floodings at the Caledonian-road.—The Main Drainage Committee reported that they had from time to time received complaints of floodings from residents and occupiers of property in Caledonian-road, north of the Regent's Canal. The 4 ft. by 9 in. by 2 ft. 6 in. sewer in that road forms a branch of the Fleet sewer, and the Engineer informed them that opposite Charlotte-street there is a sudden fall of 9 ft. in the sewer, and that during rainfall a large quantity of water passes quickly into it from the sewers in the cross streets which have steep gradients, and thus cause it to fill rapidly and to flood the deep basements on the east side of Caledonian-road. He now suggested that in order to improve the sewer by giving it a more gradual fall and constructing it as low as possible in relation to the basements and various house drains, the invert should be lowered from the point near Charlotte-street as far as Richmond-road, or for a length of about 4,350 ft. The Committee had carefully considered the matter, and were of opinion that with the view to avoiding floodings in the locality the work, which is estimated to cost 3,600*l.*, should be carried out by the Council, and they recommended—

"That the Council do approve of the deepening of the Caledonian-road branch of the Fleet sewer north of the Regent's Canal as suggested by the Engineer, and that he be instructed to prepare the necessary plans, specification, &c., with the view to the work being carried out by the Works Department."

The recommendation was agreed to.

Progress of Works at the Blackwall Tunnel.—The Bridges Committee reported in regard to the works connected with the Blackwall Tunnel that with the exception of filling up the old low-level line of sewer, the sewerage works are finished, the fireproof galvanised iron fence and the approach-road at Ordnance Wharf are completed, and at Northumberland Wharf nearly all the river wall is executed. The caisson for No. 1 shaft is sunk to a depth of 10 ft. 6 in., and rivetted for an additional height of 42 ft. 6 in.; and for No. 2 shaft is lowered 16 ft. 6 in., and rivetted for a height of 36 ft.; that for No. 3 shaft is sunk to a depth of 77 ft., or within 21 ft. of its full distance, with all the rivetting done, and that for No. 4 shaft is practically finished. With regard to the cut-and-cover portion of the tunnel on the north side of the river, no steps have been taken for some time past. All the excavation on the south side of the river for the original cut-and-cover is executed, the arch has been keyed in for a length of 120 ft.; the remaining length is complete to springing, and the arch is being turned thereon for 30 ft. In that portion of the cut-and-cover, substituted for cast-iron lined tunnel, the trench is formed for the whole length, viz., 570 ft. to an average depth of 40 ft., and the concrete foundation, including a part of the sides of the same material, is built for a distance of 160 ft. The clearing out of the portion of the trench which lately collapsed is being proceeded with, and a row of piles is being driven at each side of the excavation for the reinstatement of the timbering. Of the cast-iron lining 165 rings, being a length of 412 ft. 6 in., have been erected, and only 60 more rings have to be placed in position to complete No. 3 shaft. The subway for the pipes in the original cut-and-cover on the south side of the river is finished. In the raised approach on the south side of the proposed tunnel, a length of about 1,300 ft. of 3 ft. 9 in. by 2 ft. 6 in. sewer has been formed, the connection thereof with the southern outfall sewer in Woolwich-road is commenced; a length of 543 ft. of the 18-in. pipe sewer is completed, and the 18 pipes for tidal irrigation drains have been laid; the bank for the road has been tipped for a distance of 600 yds. The estimated value of the work executed is 350,810*l.*

After transacting other business the Council adjourned until January 16.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The usual fortnightly meeting of this Association was held on the 13th inst. in the Royal Institution, Edinburgh, the President, Mr. W. W. Robertson, in the chair. Dr. Robert Munro (F.S.A., Scot.) read a paper on "The Structure and Architectural Features of Lake Dwellings." The lecturer said that the system of lake habitation, so prevalent in Central Europe during the Stone and Bronze Ages, had so completely disappeared that scarcely a trace of it survived in the traditions of the countries in which formerly lake dwelling were most abundant. The preliminary problem which lake dwellers had to solve before lacustrine habitation became possible was how to construct a level platform on which the huts could be erected. This was effected in three ways—by driving long piles into the bed of the lake, leaving their tops projecting at a uniform level above the water, and then placing over them transverse beams, so as to form a firm platform capable of supporting dwelling-huts. The habitations so constructed were called *stilt-houses*. Substituting for piles a solid sub-structure of wood or mixed materials—wood, stones, earth, &c.—was the method most commonly adopted in Scotland and Ireland, where their remains are known as crannogs; and the third method was to construct in close proximity to each other a set of rectangular basements of wood, each side being composed of horizontal beams overlapping each other at the four corners, like the logs of a Swiss chalet. As regarded the huts of the pile structures, the only reliable data consisted of clay mouldings, hearth-stones, culinary implements. But that kind of evidence gave little information in regard to the size, form, or internal structure of the huts themselves. On these points archaeologists had to go to lake dwellings which had more permanent foundations than piles. Two important discoveries bearing on these points had come to light in more recent times. One was the entire foundations of a cottage, with portions of its walls still standing, exposed in the peat on the site of the well-known lake dwelling at Schussenried, in Wurtemberg. The other was the ruins of a circular wooden house in a crannog near Balmakie, Argyllshire. From the general review of the subject, Dr. Munro concluded that the flooring of the huts in the Pfahlbauten was formed of clay mixed with rushes, or sometimes with gravel, over which a few flat stones were placed as a hearth. The walls, probably of no great height, consisted of a skeleton of timbers and wicker-work, daubed over with a thick coating of puddled clay. The roofs were made in a cone fashion, and covered with layers of straw or rushes. The crannogs supported large wooden houses, either circular or rectangular. At the close of the lecture, which was illustrated by diagrams, a hearty vote of thanks was accorded to Dr. Munro.

ROYAL INSTITUTE OF THE ARCHITECTS OF IRELAND.—On the 16th inst. the annual general meeting of the Royal Institute of the Architects of Ireland was held at 37, Dawson-street, Mr. Thomas Drew, R.I.A.A., President, in the chair. The Hon. Secretary, Mr. Murray, read the annual report of the Council, which stated that the position of the Institute in the country was steadily improving and its members increasing. It was quite evident that the coming generation of Irish architects would be left behind in the race as compared with their brethren in Great Britain if they did not avail themselves of the opportunities for study placed before them. It was a cause of some regret that some great teaching body, such as one of their Universities, did not include a course of architectural education in its curriculum. The President said this had been a very blank year in the profession in Ireland. He had literally no incident of importance in the history of architecture in Ireland to discuss with his fellow members. They were never politicians in their Institute of Architects, but one and all of them admitted to each other that a year of political unrest was always bad for architectural progress. In this past year, while Irish politics were very much uppermost, architecture and all the arts had languished. There had been less new work started this year than he could remember in a retrospect of forty years. There was avowedly great want of employment in the building trade, and there was a pinch coming on the artisan class. They all knew of the numbers of architects' assistants who were vainly seeking employment, and of the stagnation in most of their offices during the summer.

He could not even point to a competition that had stirred them, or to litigation which had enlivened them. There was no worse sign of the prosperity of the country, and of business for architects, than the absence of litigation. They had not had even an arbitration on record in this extraordinary and unexampled inactive year. He might point, however, to one legal case in the local courts, not one in which the monetary interests were large, but in which the ruling of one of the ablest of Irish judges confirming that of the Recorder of Dublin, was a really important one as following up the ruling of English judges as to the legal rights of an honest architect in the exercise of his peculiar quasi-judicial functions. In the case of *Verschoye v. Parry*, which had been before the local courts, the law had been again vindicated. The judgment of the Recorder of Dublin, supported on appeal by Mr. Justice Gibson, was a valuable decision for Irish architects. In this case the plaintiff, who sought to impugn the *bona fides* of the architect's certificate, and to review the petty items of account as between him and the builder, was promptly informed by the Recorder that he did not hold a court for any such purpose. On the appeal, taken by the dissatisfied plaintiff, Mr. Justice Gibson's judgment was to the following effect:—"It was clear that an action did not lie against an architect for negligence in the discharge of his duty in supervising a work and seeing that the contractor carried out the specification and contract. He had never heard before of an action against an architect for certifying wrongly, assuming that a certificate was given in good faith. The position of the architect was to a certain extent a judicial one, and he had to steer an even keel between conflicting interests and opinions of the contractor on the one side and of his employer on the other, and if he were at all a good judge, he was certain to dissatisfy each. Of course, if he were one-sided and incapable, he would go altogether in favour of one of the litigants, but it would be a hard thing where an architect acting honestly had done his best to solve a controversy between two disputants that he should be personally liable merely because a jury or a court afterwards—or even the House of Lords on appeal—should decide that he was wrong in point of law or fact. There was no imputation against the honesty or desire to do what was right by Mr. W. Kaye Parry, and there was no wilful or gross misconduct on his part which it would be necessary to establish to make him personally liable." The action was dismissed, with costs against the plaintiff. There were few architects long in practice who had not had an occasional experience of a bullying employer who questioned his certificate and threatened pains and penalties with a view of reducing the builder's claims and discounting the architect's fees. Let no honest young architect be intimidated by such mean procedure. The law was with him, the sympathy and support of his professional brethren was at his call, and on his honest certificate the employer must certainly pay. The President, speaking in favour of stone building, said that the entire sympathy of every architect in that room was with the employment of cut stone work as the art of all others bound up with the perpetuation of noble architecture and the traditions of the past. In the progress and development of this century the scientific and industrial production of artificial building materials, and the ever-increasing cost of skilled labour, were developing building changes which architects could not influence. What architect was there who would not wish to realise noble architecture in native cut stone? Who was there who deliberately took kindly to the mechanical and frivolous material of terra-cotta? It was degrading to the architect. He did not even design it. It was found for him in the terra-cotta manufacturers' pattern-book. The building result was generally no characteristic design of his. As an alternative, real architects in Dublin were met with the very embarrassing position that the cost of cut stone work had somehow reached a figure that made it prohibitive to employ in any but monumental building, where cost was no object. On the subject of delays in building he might allude to an evil from which their profession suffered in Ireland—the leisurely tardiness, increasing year by year, with which building operations were carried out. It was not so elsewhere. It was not so in olden times with them. He thought they had much of the remedy for this in their own hands if they were of one mind about it. On the question of the employment of sanitary specialists his view was that in these days of

advanced sanitary knowledge the architect who was not fit to attend to the sanitation of a house should not be employed at all, and if he knew his business the intrusion of a specialist on the assumption that he was a superior and peculiar genius which no household could dispense with was uncalled for. The President then formally moved the adoption of the report. Mr. Carroll seconded the motion, which was adopted. Mr. Owen presented the auditor's report, and on the motion of Mr. Geoghegan, seconded by Mr. Mitchell, it was adopted. The ballot for the Council resulted as follows:—Messrs. Thomas Drew, President; Albert E. Murray, Hon. Secretary and Treasurer; Sandham Symes, J. J. O'Callaghan, J. R. Carroll, George C. Ashlin, Charles Geoghegan, William M. Mitchell, Sir Thomas N. Deane, J. L. Robinson, R. C. Millar, J. H. Pentland, and R. O'Brien Smyth and C. A. Owen, Auditors. Votes of thanks to the President and the Hon. Secretary having been passed, the proceedings concluded.

NORTHERN ARCHITECTURAL ASSOCIATION.—On the 13th inst., at the periodical meeting of the Northern Architectural Association, a paper was contributed by Mr. H. W. Chubb, Assoc. Mem. Inst. C.E., of London, on "The Construction of Locks and Safes." The lecturer said the subject had two branches—first, locks, and then the outcome of locks—strong rooms. These two branches had each two aspects—the mechanical and the artistic. Certainly there was not much about strong rooms that was artistic, but as to locks and keys there had been more art than mechanism. The ornamentation of locks and keys had never been erratic. It had altered in exact knowledge with the ornamentations of the periods of art. Whenever architecture, the parent of the constructive arts, changed its character for better or for worse, it elevated or depressed the character of its subsidiary arts, and these little metal objects took their share of the change. But, when viewed from the mechanical side, we saw no such guiding or controlling influence; indeed, but little rule at all except the operation of evolution.

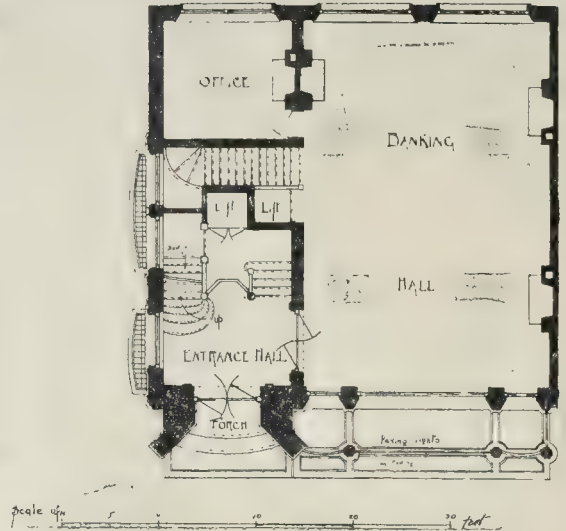
GLASGOW MASTER WRIGHTS' ASSOCIATION.—The usual quarterly meeting of the Glasgow Master Wrights' Association was held on the 14th inst. in the rooms of the Association, 64, West Regent-street—the President, Mr. William Livingstone, in the chair—when Mr. William Forrest Salmon, F.R.I.B.A., President of the Glasgow Institute of Architects, delivered an address on "The Master Wright and the Architect." Mr. Salmon spoke of the affinity of the master wright with the architect, and showed how architecture in its initial efforts was indebted largely to the carpenters of primeval times, and as master wrights had all down the centuries borne a certain share in the development and progress of the various styles, they ought to continue to devote themselves to a study of the art, and to endeavour to assist to the utmost the present eager desire for improvement in all matters connected with building. He insisted that the master wright and the architect were fellow-workers in the same cause; that where an architect is aiming at high excellence he ought to be aided in his endeavours by the various craftsmen he employs. The craftsman ought to so qualify himself that he can interpret the architect's drawings and give expression to his design.

ELECTRIC LIGHTING OF FLEETWOOD.—On the 13th inst. a report on the electric lighting question was laid before the Fleetwood Improvement Commissioners. It was the opinion of the Committee that the total capital required for a complete installation would not exceed £1,000. The system recommended for adoption is the high tension alternating system, with suitable transformers. Tenders were received from the following selected firms, viz.—C. A. Parsons & Co., Newcastle; Siemens & Co., London; Greenwood & Bailey, Leeds; Andrews & Pease, Bradford; and the Brush Electrical Engineering Co., London. The tenders ran between £5,500 and £8,700. The Committee recommended that the Brush Company's tender be accepted, but the board decided to consider the question at a special meeting.

LIFTS.—We understand that Messrs. R. Waygood & Co. are now manufacturing a "Patent Economic Lift," invented by Mr. Robert Carey, in which, by means of a suitable and simple arrangement of cylinders and rams, and a very ingeniously constructed starting valve, the consumption of water is approximately proportioned to the actual load lifted in each particular trip of the lift. This arrangement adapts itself automatically to the work to be done, without any effort on the part of the attendant working the lift, and it is claimed that a saving of 50 per cent. to 60 per cent. of the water is effected by it.



BASEMENT PLAN.



GROUND PLAN.

Nos. 52 and 53, Parliament-street.

Illustrations.

VIEW IN NORTH-WEST TRANSEPT, LINCOLN CATHEDRAL.

THIS fine drawing, by Mr. J. J. Cresswell, should perhaps be more correctly entitled "View Looking from North-West Transept," across the crossing, and showing a portion of the nave on the right. It is a very good position for securing an effective interior composition, and Mr. Cresswell has done justice to it.

A historical account of Lincoln Cathedral, with plan and further illustrations, will be found in the *Builder* for November, 1891.

NOS. 52 AND 53, PARLIAMENT STREET, WESTMINSTER, S.W.

We give the perspective view and plans of basement and ground floors of this building, which is now in course of erection. The ground floor has been arranged for banking premises, with general offices, measuring about 40 ft. by 25 ft., well lighted both in front and at back; a managers' room is in connexion therewith, and the large office in the basement is to accommodate a portion of the staff. There is a strong-room in the basement, with book and bullion lift to the ground floor, and a trolley-track and turntable leads from the strong-room to the lift.

The upper floors are arranged for separate tenancies, each floor being served by a passenger-lift. There is ample lavatory accommodation for the bank in the basement, and for the remainder of the tenants on the ground floor; housekeepers' apartments are placed on the fourth floor.

The internal fittings will be of polished walnut. The wrought-iron balustrading of the staircase, also the grilles and lift enclosures, will be supplied by Messrs. Jones & Willis.

The façades on the north, east, and west sides will be faced with an entirely new material, *i.e.*, a grey terra-cotta, having the appearance of a warm-tinted Portland stone, somewhat aged; the texture is granular; the wall surface will be treated with 9 in. by 4½ in. by 2 in. special bricks of a rich purple red colour. The whole of the terra-cotta and brickwork is being made, and will be fixed by Mr. S. H. Leech, of Harroway Works, York-road, Battersea. It will be remembered that it was Mr. Leech who read a most interesting paper upon Terra-cotta at the Institute early in this year.

The drawing of this building, of which Mr. Herbert Huntly-Gordon is the architect, was exhibited at this year's Royal Academy.

A SMOKING-ROOM IN A LONDON MANSION.

AFTER this mansion was built, but before the internal finishings were begun, the owner bought the deal skirting, door-cases, chimney-piece, and panel over another ornamental panel, with a looking-glass and the mahogany doors, from a demolished house in the City of London; the room from which these details came being higher than the new one. Some little ingenuity was wanted to fit the ornamental parts to the room already built, and to panel it becomingly, and an ornamental cornice and ceiling were wanted.

The chimney-piece was made for a higher and wider opening, and could not be cut without destroying it, so a boldly-moulded panel in Pavonazzetti marble was inserted between the wooden chimney-piece and the grate.

To give a little more interest and variety to the room, which was only about 19 ft. by 17 ft., the ceiling had pendants and panels ornamented with scroll-work.

As the room in summer time was the owner's favourite sitting-room, and the light coming from a narrow courtyard was not too good, the whole interior was painted white.

Professor Aitchison, A.R.A., is the architect, and the drawing was exhibited at the Royal Academy this year.

COMPETITION DESIGN FOR GLASGOW ART GALLERIES.

THESE plans were prepared for the preliminary competition. The intention was to design a building suited to the rapidly-increasing wealth and importance of Glasgow as a great commercial centre, and to show a plan which could be erected in clearly-defined portions.

The central feature is the music hall, and its elliptical form was adopted for acoustic reasons, and because also curved lines seem the most appropriate in appearance for a concert or music-room. On either side on the ground floor are the museum galleries, and above the picture and sculpture galleries.

The three principal frontages show similar horizontal lines but varied in detail, a broad and continuous frieze binding the composition together. Externally also, the central feature is the dome of the music hall, and its construction lines have been rigidly expressed, while its copper-covered roof would have contrasted well

with the red-tile roofs surrounding it, and the cream colour of the stone of the buildings. The whole design was governed by the fact that the site is dominated by Gilmore Hill, and the university with its high Gothic tower and spire.

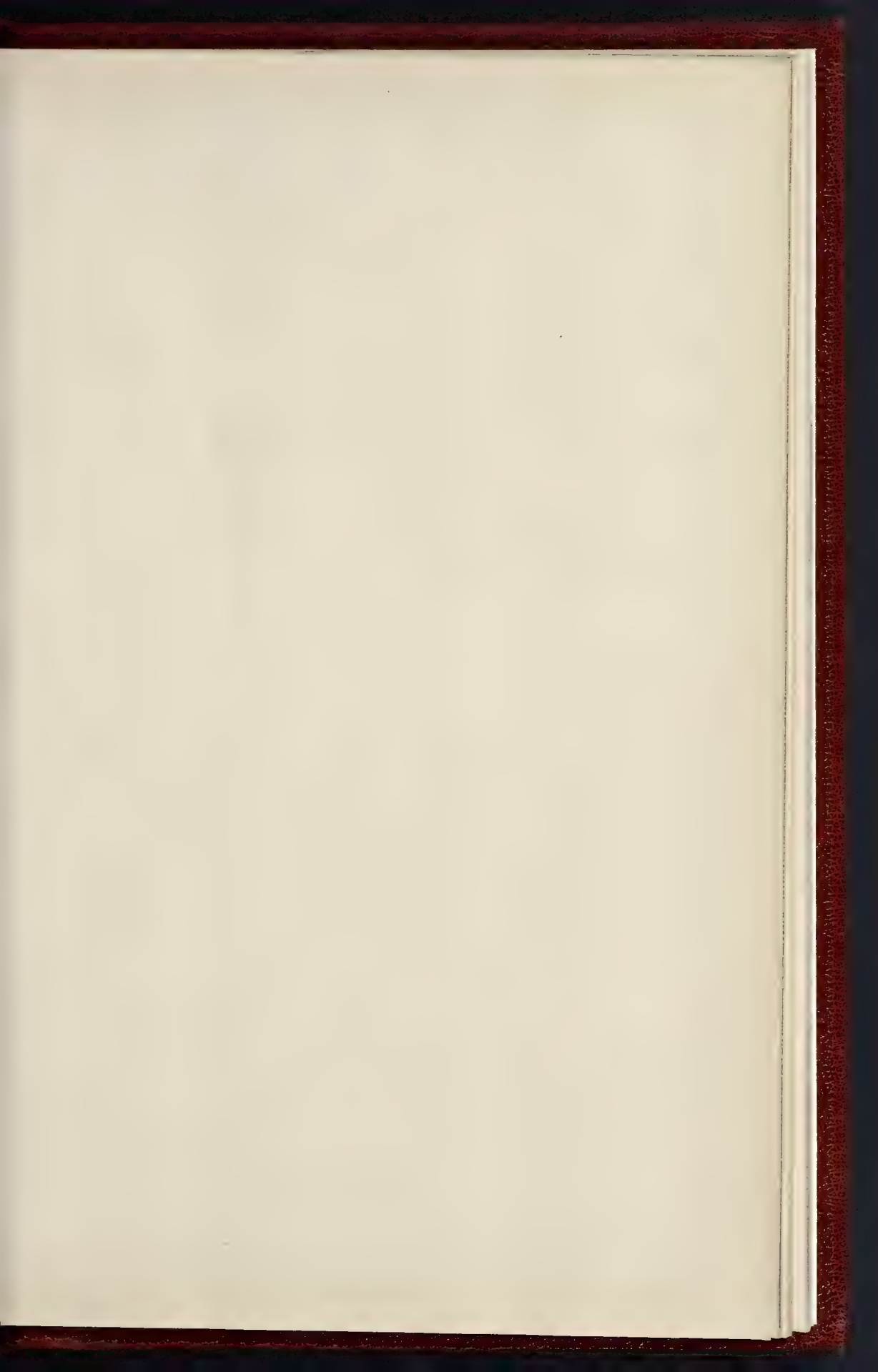
The design is by Messrs. Morris & Hunter, and the drawings of the elevations were exhibited at the Royal Academy this year.

THE POST OFFICE DIRECTORY.

"THE Post Office London Directory for 1894" (London: Kelly & Co., Ltd.), which has just been published, is the 95th issue of that useful and indispensable compilation. As in previous issues, it is corrected close up to date, and the large map which accompanies it has been mounted on linen. For so large and for such a work the Directory is singularly free from mistakes, a fact which says much for the care bestowed upon it by its editors; but we notice that the name of the hon. sec. of the Royal Institute of British Architects, Mr. William Emerson, appears in the Commercial section with one more "m" than it is entitled to, although in other sections the name is printed correctly. We have tested the work in other respects and have found it remarkably accurate. The Directory, the price of which is 32s., has increased by twenty-five pages since last year (2,883 pages against 2,858).

ALMANACKS AND DIARIES FOR 1894.

WE have received from Messrs. Hudson & Kearns, of 83, Southwark-street, S.E., a parcel of their well-known diaries, which are adapted for use by architects, engineers, surveyors, and builders. "The Architect's Diary," Nos. 12 and 13, "The Builder's Diary," No. 11, and a "Diary and Note-book," No. 9, contain useful matter for architects and others, bound in a very serviceable manner. The scope and general get-up of these diaries must be so well known to our readers that it is unnecessary for us to make further mention of them. The same firm also send us some of their date-indicating blotting-pads, in various sizes and styles, and possessing many useful features. The Banker's Pad is apparently a new style of pad, and has been made to take a folded section of blotting-paper, which can be replaced without trouble when spoilt by use—a practical advantage for more reason than one, as we feel that users of these pads will take advantage of the means thus afforded of inserting, in place of the paper which is supplied, a material possessing some power of absorption. The daily calendar memo tablets which form part of the pads are useful features.

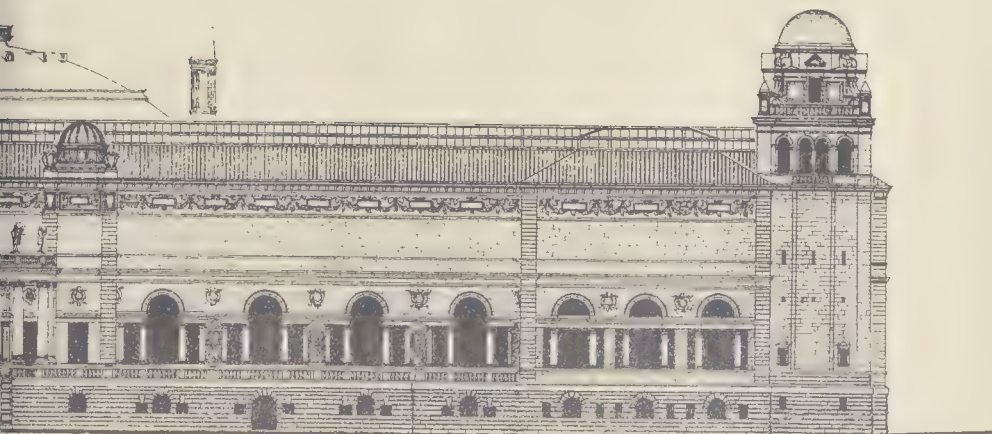




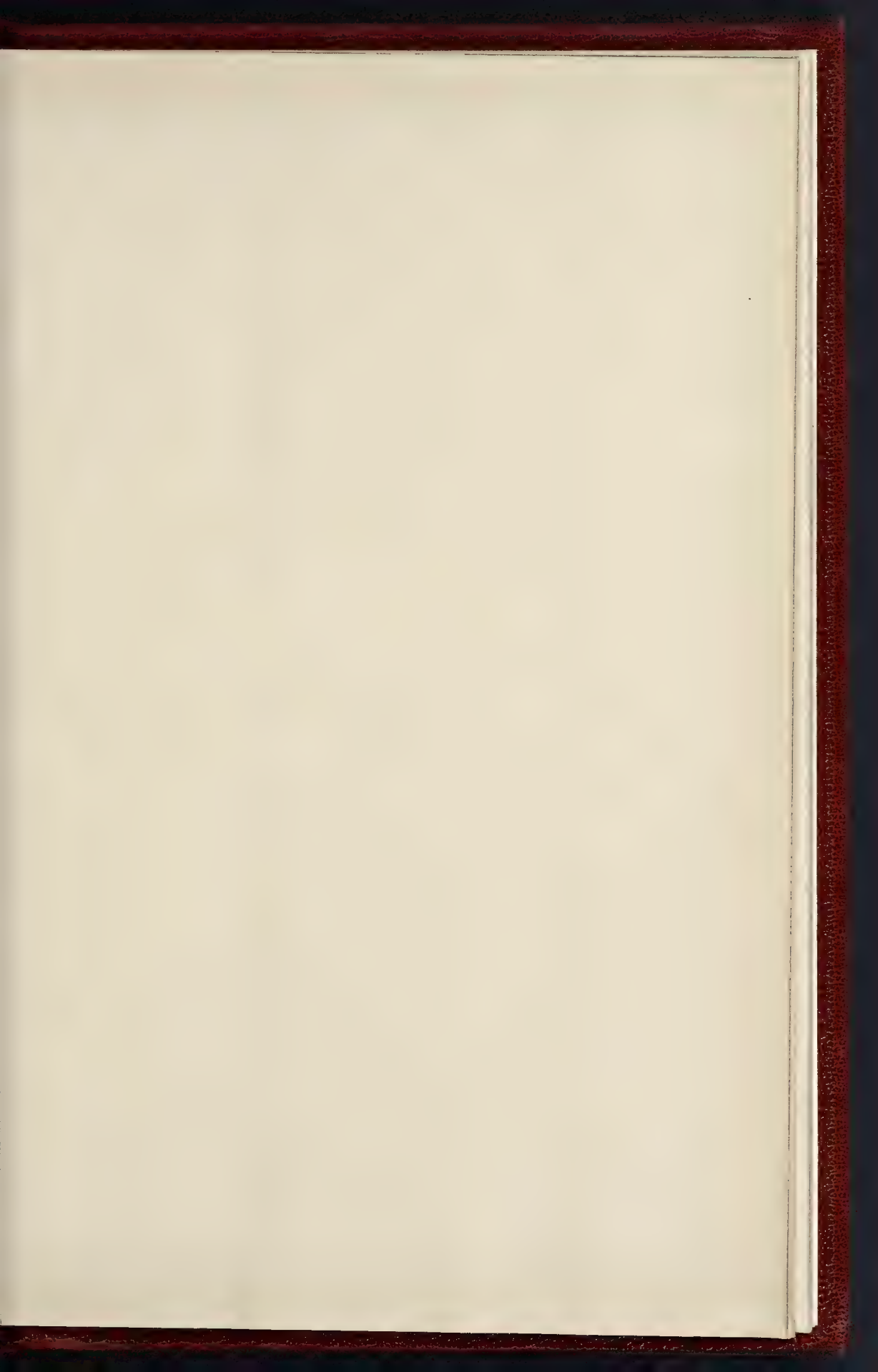
ART AND MUSIC KELMINGROVE PARK

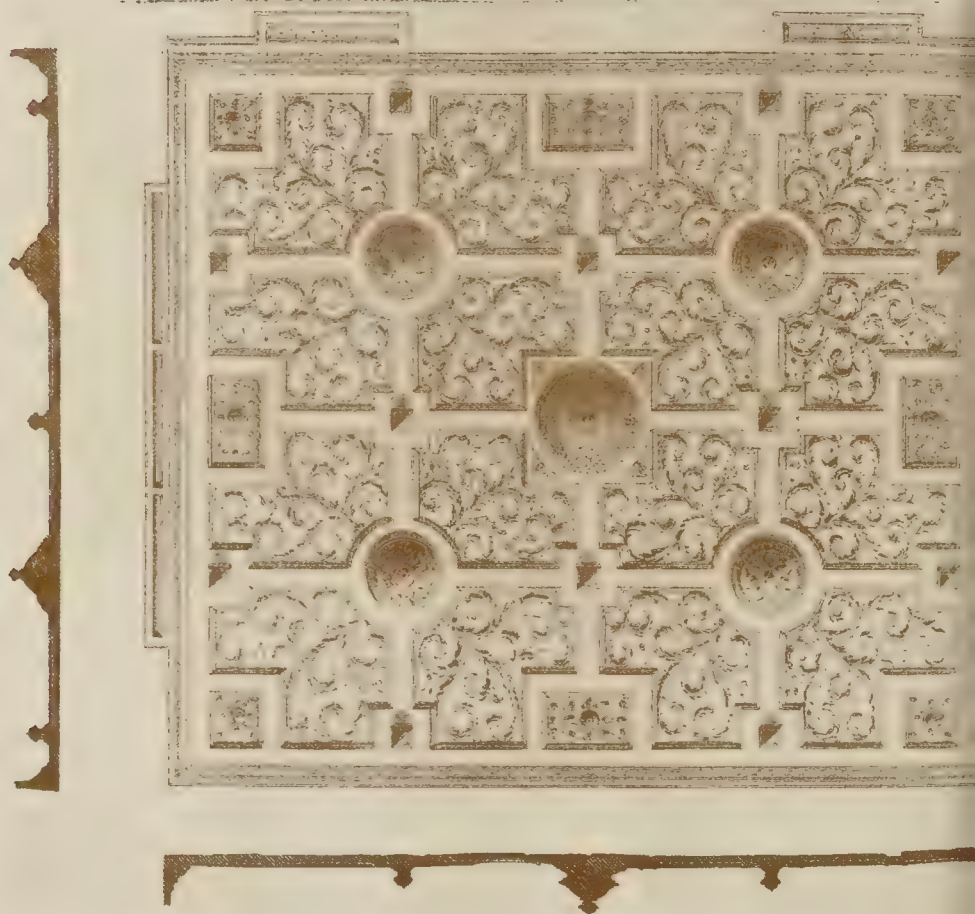


DOYFORD STREET:



INGROVE PARK:







— A SMOKING-ROOM — IN A LONDON —

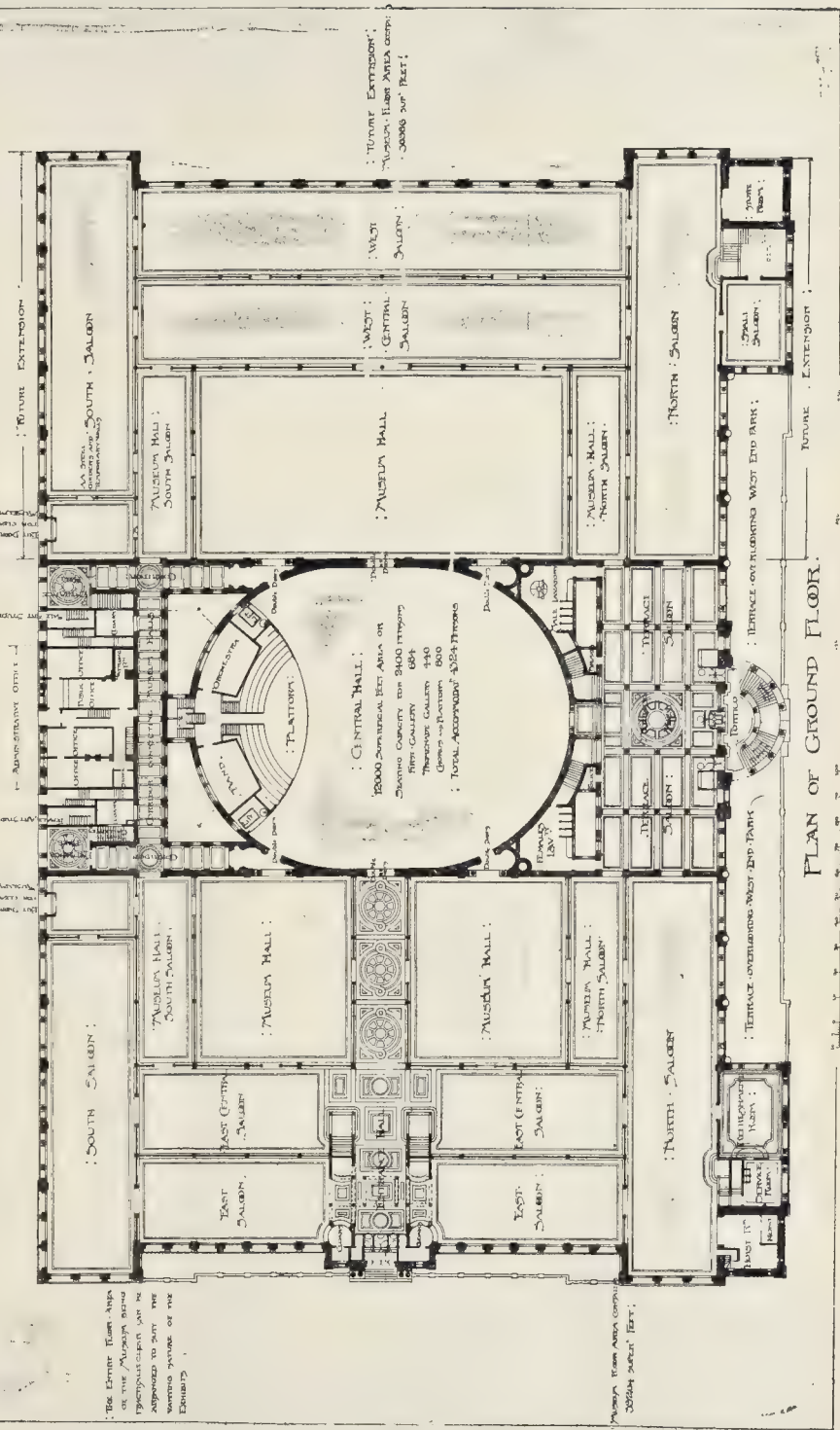
— MANSION —

— G. AITCHISON — A.R.A. —

— 150 HARLEY STREET — W. —

:CITY OF GLASGOW:

PROPOSED BUILDING FOR THE PROMOTION OF ART AND MUSIC KELVINGROVE PARK.



DEPARTMENT OF THE ARMY
OFFICE OF THE ADJUTANT GENERAL
WASHINGTON, D. C. 20315

PLAN OF GROUND FLOOR

"The British Almanac and Companion" for 1894 (London: The Stationers' Company) contains, in addition to the Calendar, and the usual contents relating to public offices and departments, a list of Acts of Parliament passed in the last Session, with abstracts of the more important ones. The work also contains useful information respecting the Universities and Colleges, with names of officials, and the year's events and occurrences. Information is also given as to railways, State pensions, police, and the government, &c., of foreign countries. Mr. R. Langton Cole contributes a review of architecture in 1892-3. In attempting to form an estimate of the architecture of to-day, he quotes the remark, made by Mr. J. M. Brydon during a discussion at the Royal Institute on the use of terra-cotta, "We are not doing great things—we are doing little things on a big scale," and further says "the words, if true, are applicable to modern architecture in other materials. That there is a tendency, in the work of leaders, to smallness of parts as well as refinement of detail, is undoubted, but that the buildings so designed are, therefore, not great, may with confidence be denied . . . the combination of boldness and refinement . . . has become one of the characteristics of those works of recent architecture which are most truly modern." Other reviews in the almanac are "Art," by Mr. Cosmo Monkhouse; "Engineering," by Mr. R. Langton Cole; "Drama," by Mr. J. Knight; "Music," by Mr. T. P. M. Betts; and "Science," by Mr. E. W. Maunders. The price of the work is 2s. 6d.

"The City Diary, 1894" (London: W. H. & L. Collingridge, City Press Office; published at 1s.), is the thirty-first annual issue of a cheap and useful almanack and diary. As one might expect, judging from the title of the diary, it contains a mass of information relating to the Corporation of London, City institutions and officers, City parishes and churches, and other information useful to City men. The diary is interleaved with blotting-paper.

"The Railway Diary and Officials' Directory for 1894" (London: McCorquodale & Co.) is another cheap and useful diary, which contains a great deal of information relating to railways. It is very clearly arranged, and forms a handy work of reference for all who are interested in railways. It is published at 1s.

"The Indian Engineer's Diary and Reference Book, 1894," (London: Victoria Mansions, 28, Victoria-street, S.W.) is the yearly issue of a publication which is presented to subscribers to the *Indian Engineer* (Calcutta). It is an admirably got-up work, and contains information for carpenters and builders; founders and smiths; glaziers and painters; plasterers; plumbers; slaters; also facts and formulae relating to hydraulics, water-supply, ropes and chains, rails, and ship canals. And besides the postal and other information which is usually found in a diary, the one before us contains rules for finding areas, solidities, &c.; electrical notes; the metric system; and a short article on the preservation of timber. The diary is interleaved with blotting-paper.

Correspondence.

To the Editor of THE BUILDER.

TULLIE HOUSE, CARLISLE.

SIR,—In reference to the statement in a letter from Mr. Howard Smith, referred to in your last, I must ask permission to state that I never received from Mr. Howard Smith any sketch or design for the Castle-street front, or any suggestion from him upon it, until after the second design. The one now carried out had been submitted to the Corporation, and was consequently in his hands, for upwards of a week. The suggestion then made was in the form of a tracing, stated by the surveyor to be taken from my design, with certain modifications of his own. It was handed to me by the surveyor in the presence of the then Mayor, and you will see by the copy of my letter to the Mayor, dated October 3, 1892, that I could not accept those modifications, and that I stipulated before proceeding further with the drawings for the front, that I should furnish all details for its execution, including particulars of the colour and materials of the roof, the glazing of the windows, the nature and materials of the down spouts, and the inside of the archway as far as the inner or west wall.

If you compare design No. 2, the one submitted to the Corporation, with the working drawing of the front as carried out, you will see that they are

virtually the same, and I cannot find in the Castle-street front any suggestions or hints that emanated from Mr. Howard Smith, except the vane on the top of the clock-tower which, unfortunately, was not included in the bond.

I send you particulars to verify my statement. Design No. 1 in possession of the Corporation for nearly two years. Design No. 2 practically the same scheme, modified to take an additional story; and I should like to know how it is possible to imagine that Mr. Smith, with access to these designs, should, even with the help of an accomplished architectural assistant, independently conceive a design like them—should, as far as I know, only produce it now, and should claim no credit for it.

CHARLES J. FERGUSON.

Carlisle, December 19, 1893.

* The following is the statement in regard to the Castle-street front included in Mr. Howard Smith's letter, to which we referred last week:—

"The facts as to this front are as follows:—When the property was presented to the Corporation, by a condition in the deed of gift, the elevation to Castle-street was to be erected according to a sketch which had been prepared by Mr. Ferguson (illustrated by you on May 6, 1891).

This elevation was based upon a plan of Mr. Ferguson's, which showed the Castle-street building utilised as a coffee tavern.

I afterwards suggested that it would be preferable to build a librarian's residence here, and prepared plans accordingly; the proposition was approved by my committee, and a member thereof and myself were deputed to obtain from Mr. Ferguson an amended design for this facade. We saw Mr. Ferguson, and having explained the proposed alteration, left him a tracing of a suggested design (copy enclosed) I had prepared for the front to accord with the altered plan.

This design, as you will see, was not very dissimilar to what has been carried out; but I do not, and never have desired to claim credit for this particular facade."

The obvious conclusion that most readers would draw from this is that Mr. Howard Smith had handed to Mr. Ferguson a design of his own for the alteration to the Castle-street front, that this was "not dissimilar to the one carried out" (in other words, that Mr. Ferguson had practically adopted it), but that the Surveyor was too magnanimous to take any credit for it. It now appears that Mr. Ferguson's second design had been in existence and in the Surveyor's possession for a week before the latter presented his tracing, and that Mr. Ferguson refused to have anything to say to the design on the tracing. As to the motive of the sentence we have quoted from Mr. Howard Smith's letter, and the conclusion he intended should be drawn from it, we may leave our readers to form their own opinion.—ED.

TREATMENT OF COMPETING ARCHITECTS.

SIR,—I have noticed in the *Builder* of the 16th inst., that the Sandown Conservative Club Competition is considered to have beaten the record for a closed-list manner of dealing with the expected competitors. I think, however, if you will permit me to take up the question I can show that it is by no means such a comparatively bad case. In the first place no deposit is required. Then, as far as not committing themselves to be necessarily bound to employ the winning competitor, the committee are only following the usual form of conditions in England. The Americans seem to be the first to give an undertaking to employ a successful competitor. The scale 8 ft. to an inch is not unusual. The fact of the plans becoming the property of the promoters is, unfortunately, a condition too well known to need comment, but in this case it is only the plans taking first prize that are confiscated!

The prizes offered are miserable, no doubt—in fact, quite unprecedented. Now, Sir, may I draw your attention to the competitions just advertised for the Beveridge Public Hall, Free Library, and Adam Smith Memorial Hall, Kirkcaldy. Here the promoters want £1. 1s. to begin with, which will be returned to the unsuccessful competitors, then plans and specifications are required. Finally the successful competitor is mulcted of his guinea and is offered 4 per cent. commission. Why should the "canny Scot" always want "another shapence?"

FAIR PLAY.

* It was specially in regard to the ridiculous amount of premium offered (£1. and 2s.) that we considered this competition exceptional. The demand for competition drawings to a working-drawing scale is no doubt an increasing habit, and ought to be protested against on every occasion. The writer does not mention the amounts of the premiums in the Kirkcaldy competition; they are 50s., 30s., and 20s., which rather weakens his point. On the other hand, the offer of one per cent. below the customary commission is no doubt another most objectionable innovation, and architects of any standing ought to refuse to compete under such conditions.—ED.

BATH PUMP-ROOM COMPETITION.

SIR,—Much as I admire the straightforward tone of your Note in page 445 of last week's *Builder* on what appears to be a very painful story, I still feel very strongly that the simple logic of the office of professional assessor must be to give a final and binding choice ruling equally both sides. If architects in competing pledge themselves (as I believe they do) to loyally accept the ruling of the professional assessor, surely the committee who invite the competition and employ the assessor should do the same; if not, why appoint such an official at all? Unless this point is fairly met and accepted by both sides, there is but the barest chance of escaping the heart-burnings of that old condition of things (from which we should by this time be free) when those who invited competitions were the sole arbiters, not only on the question of taste, but also of what is far more important—suitability of plan, and loyalty on the part of competitors to the instructions laid down as to scale and outlay.

E. SWINFEN HARRIS, F.R.I.B.A.

* See our Note on page 463.—ED.

THE CAUSES OF BAD WORK.

SIR,—Are you not somewhat unfair to a large class of skilled craftsmen when you attribute the deterioration of workmanship to the influence of trades unions? You are surely upon much firmer ground when you "are inclined to think that a good deal of the fault lies not so much with individuals as with a system."

Many years' practical experience has taught me to consider the causes which produce bad workmanship in connexion with buildings may be roughly classed under four heads:—

1. The system of rapid building where quality of workmanship is sacrificed to rapidity of execution.
2. The system of shoddy speculative building by which men are trained to put as little labour and skill as possible into their work, but to make the work look like what it ought to be, rather than to be what it looks like.
3. The system of unlimited competition which fosters a class of builders and foremen who have no knowledge or experience of good work.
4. The system of "building committees," composed in too many instances of persons ignorant of building and unable to understand plans, but with keen commercial instincts which urge them to accept the lowest tenders in unlimited competition, assuming that the architect is bound to get best work done, whatever kind of builder is employed.

I believe the average artisan earns and enjoys the respect of those who fairly regard his work and the conditions under which it is done, and the skillful, painstaking works produced in some of the best builders' shops cannot fail to excite admiration and deserve the highest praise. The shoddy and scamping are almost exclusively confined to quarters where quantity is better appreciated than quality.

The real evil is deep-seated in the region where simplicity has been dethroned, and is not confined to trades-unionists.

The men would be weak and foolish indeed if they did not combine to protect themselves to obtain reasonable rates of remuneration. Although trades-unions have acted, and will probably continue to act, unwisely, the results and tendency of the combination has been good, and decidedly beneficial to the community. In time, no doubt, these organisations will improve, and the evils incidental to youthful organisms will disappear with increased experience and just treatment.

I know of nothing more calculated to bring about the elimination of bad workmanship than conferences and discussions such as the one which gave rise to your comments. You are usually so fair and impartial that I venture to hope that you will agree with me that the systems I have mentioned are much more to blame for bad workmanship than what you describe as the "organised indifference" of trades unionists.

J. OSBORNE SMITH.

* To our correspondent's three first-mentioned causes we have several times drawn attention; among other occasions in the very article to which he refers. Our opinion as to the bad influence on work of modern trades-unions was based, as he might have seen, on the evidence of several large employers of labour. We do not for a moment suggest that bad workmanship is not to be found as well outside as inside the ranks of unionists. But we say that the trades-unions have placed before their members the object of getting as much as possible for your work, not that of doing it as well as possible.—ED.

SIR,—The apparent partisanship that you refer to in your article of last week of Mr. Mundella in naming the witnesses of the Royal Commission, was no doubt caused by the absurd answers to his questions.

However, they were fitting replies to Mr. Owen Fleming's lament of the decadence of skilled workers; for, in answer to every one of the questions, the reply was not so much an one deploring the lack of quality as quantity—more,

more was wanted. You could read between the lines the familiar complaints, "get it done," "it will not pay," "shall lose money by the job." I have heard the same cry for thirty years, so you see, when men did more than twice as much (according to Mr. Bird) as they do now, the complaint was the same.

A JOINER.

SIR,—In commenting on the very interesting discussion which took place on the above subject at the Architectural Association, you, in common with many others, "run amuck" of what is known as the levelling-down policy of Trades Unions. Pray permit me to explain the real position.

Not long ago, before the Unions wielded* the power and influence they do now, various methods were adopted to facilitate the execution of the work in the cheapest manner possible. Men were paid all sorts of prices BELOW what was recognised as the ordinary rate. The best men only were paid this rate, and these were invariably told off to get up the gables, cut and set the arches, &c., and in fact do all the work where the most skill was necessary; the inferior hands at the ordinary prices done all the other parts of the work where less skill was required. When the front was up, or the most difficult and important work was finished, the men paid at the ordinary rate were paid off and those who worked for less wages were kept on. This system militated against the best mechanics who frequently had to walk about the streets in search of other employment whilst the less skilled workmen were at work.

Under these conditions there was every incentive for a man not to become a skilled mechanic; side by side with this came the sub-contracting system, where the same methods were adopted, though generally in a much worse form, where every incentive was given to scamp the work; then came the introduction of that sham called "painting," whereby rough and shoddy material and inferior workmanship was smuggled, daubed, and veneered over with a view to making it look as near like a genuine article as it is possible to make a counterfeit. These and many other evils were allowed to grow year after year until not only did the workmen become demoralised, but the employers and all connected with the Building Trades became of one feather. Cheapness, the idol of the British Public, became the first and generally the only consideration, whilst quality was seldom considered at all.

For all the years that this has been going on, and the Building Trade fast going to the dogs, practically nothing has been done to improve the quality of the work deteriorating, until it is discovered that the men do not lay as many bricks as they formerly did, when the Architects discover that the quality of the work is not as good as it should be, and then both Builders and Architects (with a few brilliant exceptions) agree that the Unions are responsible for all the evils of which they complain. A greater mistake than this has never been made.

It is the action of the Unions in endeavoring to remedy the evils from which (we know we suffer) that has brought about the climax. The Unions have recognised that unless something was done to raise the standard of workmanship and crush the evils by which we have long been cursed, that we should drift from a bad to a worse, and therefore determined, by a vote taken, not to countenance the production of shoddy or inferior work in any shape or form, and the result is that the quality of the work done in London this last eighteen months has generally improved, and the quantity performed is naturally somewhat less, and this is therefore the whole crux of the question. The old system meant the survival of the unfittest, but the new system means the survival of the fittest. By fixing a minimum wage the best skilled has the best chance, as it is his reward to be chosen and to be kept at work, and the inferior man is discharged first, which fact should certainly act as an incentive to the inferior to become a superior workman, and I may here add that there is no rule to prevent a man receiving more than the minimum wage except the rule of the employers not to give more.

I presume, Sir, that you will agree with me when I say that in discussing these questions it is always best to discuss them from a purely scientific point of view, apart from all prejudice and personality, and probe them to the bottom if we would deal with them at all.

Mr. Fleming complains (and justly so) of the slipshod character of the work and the faulty materials, and must remember workmen have to obey instructions, and they have no choice in what materials they use.

Much stress was laid upon the fact of the plumbers having made progress during the last few years, and why have they been able to do so? Because public attention has been rivetted to the fact that bad sanitary arrangements, bad joints in soil pipes, &c., are closely associated with typhoid fever and diphtheria, and most of the terrible scourges that "flesh is heir to." Once persuade the public conscience that bad joints in brickwork or woodwork will be attended with the same dire result, and shoddy building and inferior workmen will speedily become things of the past.

The Unions have heavy responsibilities, and they

can bear them; they are making for progress, and we sincerely believe, prospering. Thanks to them the workers are slowly but surely working out their own emancipation, and if their aims, objects, and methods are not in accordance with every one's ideas that is no concern of ours, we shall still go on our way; we have Time on our side, and we are working to mould a brighter and happier Future.

Our critics must condemn us if they will, and believe we are as black as we are painted, but we are as demoralised as represented, but I do hope they will, nevertheless, remember how little they have done to make us otherwise.

H. R. TAYLOR.

SIR,—Apropos of the discussion as to London Workmen, reported in your last issue; having just completed a contract within the London district, we are in a position to confirm the remarks made as to the large percentage of incompetent workmen and enormous cost of work generally.

The following figures, taken from our books for this one contract, may be of interest:—

Bricklayers—85 men, out of a total of 215 set on, discharged for incompetency, not earning their wage, or keeping bad time. Carpenters—18 out of 53. Plasterers—14 out of 22. Plumbers—2 out of 16. Labourers—77 out of 212.

The percentages in the various trades can be easily calculated, and, with regard to the bricklayers especially, more would have been discharged had we been less pressed for time.

With regard to cost, the plastering, all of the plainest description, proves to have cost just half as much again as a fair piece-work price, and the labour on the brickwork, inclusive, at least 3/ per rod more—after allowing for difference in rate of wages—than exactly the same description of work cost us in the country.

In conclusion, we may say that no amount of indignant protestation on the part of Alderman Taylor or other officials connected with trades unions will alter our conviction that there is a rule—unwritten, perhaps, but strictly enforced—which has the effect of reducing the energies of the workmen to a certain low standard, fixed as we should say, as nearly as possible, at the irreducible minimum.

BROADMEAD.

NATIONAL ASSOCIATION OF OPERATIVE PLASTERERS.

SIR,—The above high-sounding title may cover a multitude of sins.

In the monthly report of this Association for March last they give 2,448 paying members for London and the suburbs, and 4,034 for the provinces and other parts of the country, and yet, at the Workmen's Exhibition, held at the Agricultural Hall, when prizes were offered for exhibits of superior workmanship only one plasterer sent in a *bona-fide* exhibit of plasterer's work, and he might not have been a Unionist. Further comment would be useless.

A VISITOR.

QUANTITY OF WATER REQUIRED FOR FLUSHING WATER-CLOSETS.

SIR,—In your last week's edition you draw attention to the very valuable set of experiments made by a Committee of the Sanitary Institute at the request of the London County Council with a view to ascertain the quantity of water required to efficiently flush a water-closet, and it is to be greatly regretted that these experiments have not been further extended. Apart from the quantity necessary for an efficient flush, they also throw light on the relative merits of 4-in. as against 6-in. pipes, and it is in reference to this point that more information is required. The conclusion to be drawn from the experiments does not seem to confirm the opinion frequently held, that the flushing power, with the same quantity of water and the same gradient, is greater in a 4-in. than in a 6-in. drain. If, for instance, the case of a 4-in. pipe, 26 ft. and 50 ft. long, and laid at a gradient of 1 in 40, is compared with that of a 6-in. pipe under like conditions, it will be found that a 4-in. pipe, 26 ft. long, has, with a flush of 2 and 2/3 gals., a slightly greater scouring power than a 6-in. pipe, but that this advantage disappears as the length of the drain increases, and that when this has reached 50 ft. the 6-in. pipe has a distinct advantage over the 4-in. pipe. With a flush of 3 gals., however, the 4-in. pipe maintains its slight superiority over the 6-in. pipe, even when extended to 50 ft., as the following table shows:—

Quantity of water used for flushing Gallons.	Length of drain.	Difference between 4-in. and 6-in. pipes.	Length of drain.	Difference between 4-in. and 6-in. pipes.
2 2/3	26	7 per cent. in favour of 4-in. pipe.	50	15 per cent. in favour of 4-in. pipe.
3	26	4 per cent. in favour of 4-in. pipe.	50	18 per cent. in favour of 4-in. pipe.
4	26	0 per cent. in favour of 4-in. pipe.	50	5 per cent. in favour of 4-in. pipe.

To put the case shortly, from the experiments it would appear that the advantages of a 4-in. pipe over a 6-in. pipe in a 25-ft. length of drain are but slight, and that in a 50-ft. length of drain a 6-in. pipe has distinct advantages over a 4-in. pipe as far as the scouring power is concerned. If this deduction is correct, then it would be an advantage in future to employ 6-in. pipes instead of 4-in. pipes, as the area of a 6-in. pipe is more than twice that of a 4-in. pipe, and its extra cost over a 4-in. pipe not very considerable.

As this result is somewhat contrary to what has generally been accepted, and as this matter has attracted a great deal of attention, it is greatly to be hoped that the Sanitary Institute will see its way to take up these experiments again, and enlarge their scale so as to throw full light upon this important question.

H. ALFRED ROEHLING.

Leicester, December 19, 1893.

SIR,—As one who for years back has been condemning the dangerous and unhygienic pseudo-water-saving policy of restricting the water-flush of a closet to only two gallons, you will permit me to express the satisfaction I felt at reading the article on this subject in pp. 444-5 of the *Builder* for the 16th inst. The experiments made by the Sanitary Institute amply confirm what I often have said, that the two-gallon flush did not cleanse the closet properly, while it often simply deposited the soil in the drain, and left it there to generate foul gases, to the detriment of the atmosphere in the neighbourhood. I sympathise entirely with you in your advocacy of the four-gallon flush as the maximum, while no flush should be less than three gallons.

W. P. BUCHAN.

REDESSSED SANDSTONE.

SIR,—I shall be obliged if any of your readers can tell me how to preserve the face of redressed sandstone, and if linseed-oil is a good thing.

J. G. ALLOTT.

ANTWERP INTERNATIONAL EXHIBITION, 1894.

SIR,—In your issue of the 9th inst., under the heading "Belgium," you give certain information in regard to the Antwerp Universal Exhibition next year, and in mentioning the name of Mr. de Courcy-Perry you state that "he will act in his private capacity as the agent of the British exhibitors."

I am directed by the Commissioner-General to say that you have been misinformed.

As H.B.M. Consul-General in Belgium, Mr. de Courcy-Perry cannot undertake any private business of any nature whatsoever.

With the authorisation of Her Majesty's Government, the Consul-General has been appointed Commissioner-General of the British section, and in this capacity will watch over British interests at the forthcoming exhibition. He will have nothing whatever to do with private interests.

Kindly publish this letter in your next number, of which the Commissioner-General will be glad to receive a copy.

WILLIAM LAYTON,
Secretary to the British Commissioner.

The Student's Column.

GEOLOGY.—XXVI.

THE present article will be devoted to the consideration of various miscellaneous minerals, rocks, and substances used by architects either in the manufactured form, or in the natural state, and which have not been previously adverted to in the connexion indicated.

Sand is typically composed of minute grains of quartz loosely compacted, which may be angular, sub-angular, or rounded. It is commonly mixed with more or less foreign matter, such as particles of felspar, mica, &c. When very pure it may be manufactured into glass, and has been largely exploited for that purpose. The principal use of sand to the builder is in making mortar, when the angular (sharp) varieties are chiefly called into requisition—at least in making good mortar. As an ingredient of artificial building stones it is extensively used, especially on the Continent. A mixture of fine sand with a very small proportion of clay, is dug for casting purposes. Sharp sand is much employed in sawing certain building stones. Firmly compacted by pressure, or bound together by some cementing mineral it forms sandstone; when the latter has frequent beds (determined in many instances by layers of flakes of mica) and is more or less fissile, we get flagstones.

Clay, when pure, is a hydrous silicate of alumina, perfectly white, and has resulted from the decomposition of felspar. The majority of clays, however, contain much foreign material,

and are mostly stained by iron. The white or light grey varieties are largely manufactured into terra-cotta, and great care is expended in the preparation of the material for that purpose. Certain clays are suitable for making bricks, tiles, earthenware drain-pipes, &c. Brick clays are very widespread; they contain sand, lime, iron and a host of impurities. The proportion of free quartzose sand in the clay, as well as the actual composition of the clay itself admit of great variety. A good brick clay should not contain much iron, lime, potash, or soda, but sand is essential.

Fire-clay is a name given to varieties of clay that will bear intense heat without running or melting in the kiln, and the fire-bricks made from it will also bear exposure in the interior of furnaces. It is obtained in large quantities and is extensively worked near Stourbridge, Newcastle-on-Tyne, and in the neighbourhood of Glasgow—also in Yorkshire, Staffordshire, and Glamorganshire. In the counties of Durham and Northumberland it usually lies beneath the Coal Measures in layers varying in thickness from 1 ft. to 5 ft. or 6 ft. Chemically, it is composed (like ordinary clay) of silica and alumina; the refractory character of any sample of fire-clay is determined by the proportions in which these two ingredients are contained and by the absence of lime, iron, or other easily fusible substances. According to Mr. Joseph Cowen,* the best descriptions of fire-clay—those which, when manufactured, are capable of resisting the greatest heat—always contain a large proportion of silica. The following chemical analyses refer to the composition of the material raised (1, 2 and 3) near Newcastle-on-Tyne, (4) at Stourbridge, and (5) at Glasgow:—

Chemical composition of Fire-clays.

	1	2	3	4	5
Silica	51.11	51.10	83.29	51.80	65.20
Alumina	30.40	31.35	8.10	30.40	33.41
Oxide of Iron...	4.74	4.63	1.38	4.14	4.49
Lime	1.70	1.16	...	...	...
Magnesia	trace	1.54	2.99	...	...
Phosphates...	...	...	...	...	...
Water and Organic matter	12.29	10.47	3.04	13.11	...

It is not only for lining furnaces and making retorts that fire-clay is employed; the low-priced fire-bricks have, for many years, been used for ordinary building purposes, and the raw material in the manufacture of chimney-tops, flower-vases, pipes, &c.

Lime is made by calcining limestone; as there are different kinds of limestone, more or less impure, it necessarily follows that limes are also very variable, having widely different qualities and properties. They require special treatment to obtain from them the best result. The purest carbonates of lime, such as statuary marble or chalk, make what is called a rich lime, setting firmly only in dry air, whilst the impure carbonates, in which clay is largely mixed with the limestone, result in the production of what are known as hydraulic limes, which set more or less rapidly in moist air, or even under water. The student will understand from this that special properties may be imparted to a lime by the admixture of foreign substances in the manufacture of cement, mortar, and stucco. The late Professor Ansted divided† limes into five classes, as follows:—(1) Rich limes, (2) poor limes, (3) moderately hydraulic limes, (4) hydraulic limes, and (5) eminently hydraulic limes. Rich limes are obtained from the purest and hardest limestones that do not contain more than from 1 to 6 per cent. of silica, alumina, magnesia, iron, or other foreign substances. Poor limes are obtained from limestones in which these impurities are present to the extent of from 15 to 30 per cent. It is considered that fossiliferous limestones make bad mortar, as the slacking is irregular. Limes containing much silica swell in setting; on the other hand, where alumina is in excess, the lime is apt to shrink and crack. Hydraulic limes are of many kinds, and of great value for constructional purposes. They are obtained (a) by burning certain varieties of calcareous rock; or (b) manufactured artificially by mixing limestone with the requisite foreign ingredients or (c) by combining quicklime with other materials. It is generally considered that from 15 to 25 per cent. of a limestone should consist of silicate of alumina, in order that it may burn into a good hydraulic lime. The concretions called "septarian nodules" in the London Clay, and in several clays of Jurassic age, are eminently

* "Industrial Resources of the Tyne, Wear and Tees."

† "Applications of Geology," 1865, p. 124.

suited to the purpose; whilst the hard calcareous bands in the Lias at Barrow-on-Soar and elsewhere have for many years yielded cement of excellent quality. Very good hydraulic cement is made by the artificial admixture of the river mud coming from calcareous and argillaceous districts, with chalk before burning.

Iron is very widely disseminated on the surface of the earth, though except as museum specimens it is rarely seen in its native condition, occurring mostly as oxides, carbonates, &c. Valuable ores of iron, however, are not particularly common. The richest are the protoxides; the next the peroxides; and the least rich, but most abundant, the carbonates of the oxide. Magnetic iron, a mixture of protoxides and peroxides, is not abundant enough in this country to be worked as an ore; but in Norway, Sweden, Russia, and the United States, it commonly occurs. Hematite, a peroxide, is found principally in the Carboniferous Limestone of the North of England, especially in Cumberland. Hematite is also obtained from Derbyshire, the Forest of Dean, Somersetshire, and South Wales. It is a very rich ore, but is frequently mixed, for commercial purposes, with the carbonates and poorer classes of iron. By far the greater number of iron ores are impure, earthy, and carbonaceous minerals, amongst which iron oxide occurs to so large an extent as to be worth reducing; they are worked, principally, in the Coal Measures and Lias formation. The clay ironstones are various shades of brown and orange, to purple and black, and it is fortunate that they are found in such close proximity to coal. The ironstone of the Lias in the Cleveland district is well-known; the main seam is practically inexhaustible. The relationship existing amongst the earthy constituents of this ore varies somewhat in different localities; indeed, the seam itself in the same section is by no means uniform in composition. The Northampton Sand, a member of the Jurassic series, contains an iron ore which is raised near Kettering, and other parts of the county whence the formation derives its name. At Westbury, in Wiltshire, beds of Corallian age are also actively exploited to obtain iron ore; it is put into the furnaces with a certain amount of coke, and some of the Coralline oolite as a flux. The slag is utilised for building purposes and road metal, whilst paving material is made with the help of cement.

Lead is for the most part found in veins or lodes. There are many different kinds of the metal, but by far the most abundant is galena, or sulphide of lead, the chief commercial ore. A chemical analysis of this shows:—

Lead	85.13
Iron	50
Sulphur	13.02

Galena occurs in rocks of different geological ages from the Cambrian to the Triassic; and also in granite. Cornwall, Cardiganshire, Cumberland, Denbighshire, Derbyshire, Durham, Northumberland, Flintshire, Shropshire, Westmoreland, and Yorkshire are counties in which it is at present being extensively worked; but a large proportion comes, in addition, from the Isle of Man and parts of Scotland.

Tin is obtained in Cornwall and Devon from lodes, or veins. In times gone by, a considerable quantity of the metal was derived from superficial deposits, &c., and this is called stream tin. The method of washing the tin streams was very simple, and the rude utensils employed were usually fashioned out of hard wood. The whole of the tin found in the drift was, like the drift itself, the product of denudation, the tin having come from the decomposition of the lodes that once contained it. The stream tin generally reposes directly on solid rock, and is often in a remarkably clean condition, with but little admixture of gravel. The ore from some lodes* is so rich as to require but little preparation for the smelter; but practically all the tin-stone has to be stamped and dressed. As many mines produce tin-stuff containing only one or two per cent. of tin, the numerous washings which it undergoes result in a considerable loss of fine tin-ore, which certainly equals, if it does not exceed, a fifth of the tin that the vein-stone originally enclosed. The metal is largely employed in the tin-plate trade; is mixed with lead to form pewter; with copper to make bronze; and with copper and zinc to make brass, bell-metal, &c.

Copper is more widely diffused than tin: is much more malleable than ductile. The richest of the ordinary ores appear under two aspects; the first has a metallic lustre, a copper red,

brass yellow, iron grey, or blackish grey colour, sometimes inclining to blue; the second is without metallic appearance, has a red colour, verging upon purple, blue, or green, the last-mentioned tint being the most usual. The deposits of copper in Cornwall occur as veins in granite; those in the Isle of Anglesa, of Westmoreland, Lancashire, and Cumberland, of the south-west of Scotland, the Isle of Man, and south-east of Ireland occur in the Archæan and older Primary rocks, sometimes in masses, but more frequently in veins. Practically all the copper ore mined in England at the present day comes from Cornwall and Devon.

Zinc is raised principally in Cumberland, Denbighshire, Flintshire, Cardiganshire, and the Isle of Man. It may be described as a bluish-white metal, of considerable lustre when broken, but easily tarnished on exposure to the air. Commonly known as "spelter"; when pure it is malleable at the ordinary temperature, whilst commercial cast-zinc is brittle.* Zinc forms with other metals a most important class of alloys, such as brass, German silver, &c. It is used in the form of sheets, worked into a variety of shapes; it protects iron from rusting, as in galvanised iron; whilst it forms the electro-positive element in many batteries.

Arsenic occurs native, in veins in very ancient rocks; it is found in the state of oxide, also combined with sulphur, &c. Cornwall and Devon are the only counties producing it at the present time. It is employed principally in the manufacture of glass, and to a certain extent also; by some, in colouring wall-papers.

GENERAL BUILDING NEWS.

PUBLIC BATHS, BACUP.—These baths were opened on the 15th inst. by Mr. J. H. Maden, M.P., having been presented to the Borough of Bacup by his late father. The baths have been designed and carried out by Messrs. Mannall & Littlewoods, architects, Manchester, selected in a competition, the cost, including land, being about 10,000l. They are situated in Rochdale-road, and include first and second class swimming-baths, first and second class men and women's slipper-baths, and Turkish baths, the contractor for the main structure being Mr. James Hargreaves, Bacup; hot and cold water engineering, Messrs. Jaffry & Co., Manchester; steam service and laundry engineering, Messrs. Elliott & Sons, Manchester; the steam boilers and pumps, Mr. Edward Wood, Manchester; Mr. Corcoran, of Manchester, acting as clerk of works. Each entrance is of sufficient width for double turnstiles in and out. The women and first-class men use one entrance and the second-class men the other. The laundry and washhouse with drying closet are placed over the boiler house, which is provided with two boilers. There are six slipper-baths for women. The first-class swimming bath is 60 ft. 3 in. by 37 ft. 5 in., with a water space of 50 ft. by 20 ft., with dressing-boxes on each side, also foot-bath and shower, with water-closets and urinals. The second-class bath is 82 ft. by 42 ft., with a water space of 75 ft. by 24 ft., with a sufficiency of dressing-boxes arranged on each side, also with foot-bath and shower, and two water-closets and urinals convenient thereto, and narrow staircase to approach the gallery. Each swimming-bath is lighted from the roof with inclined and vertical lights. A narrow gallery has been erected on each side of the second-class baths for visitors. The laundry is placed over the boiler-house, and has a concrete floor. It is fitted with drying closet. The design of the building is English Renaissance. The front and two principal side elevations are faced with Yorkshire parpingtons, backed up with common brickwork—and Yorkshire stone used for the Ashlar work. The steps, flags, and copings are from the neighbouring quarries.

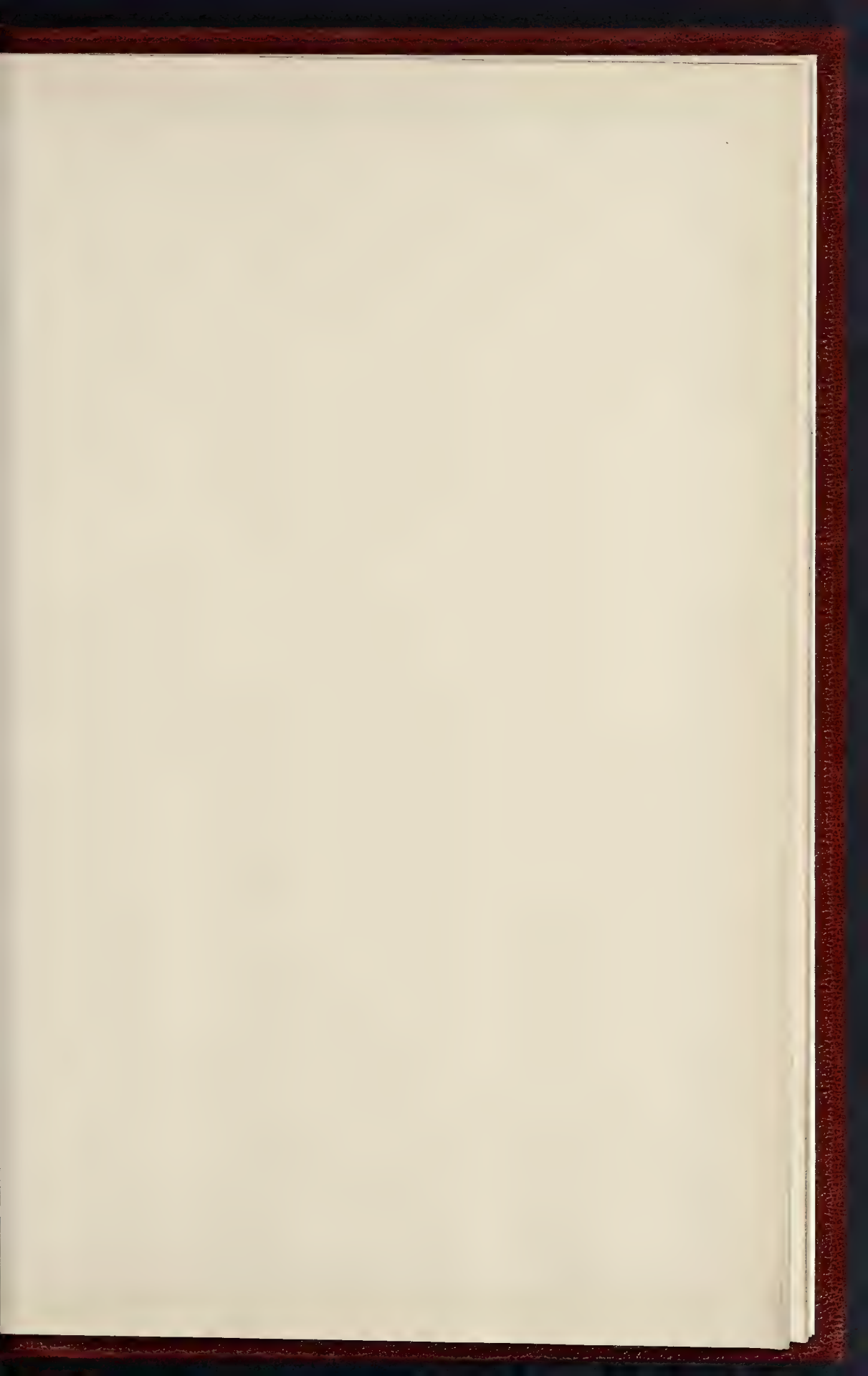
PARISH HALL, RYTON, DURHAM.—A new Parish Hall has just been opened at Ryton. The building, which stands on the top of the Station Bank, has been erected at a cost of 1,350l. Sitting accommodation is provided for about 400 people. The hall has been erected by Mr. W. Lishman, of Blaydon, from designs prepared by Mr. Crawford Hicks, architect, of Newcastle.

CATHOLIC CHURCH, SUBURBY.—This church, of which the foundation-stone was laid by Dr. Riddell, Roman Catholic Bishop of Northampton, on June 27, was opened a few days ago. The building consists of the church itself, with lady-chapel adjoining, and a large room beneath, which can be used for various purposes. It communicates with the presbytery and the residence of the mission priest. Mr. L. Stokes, of London, was the architect, and Messrs. Grimwood & Sons, of Sudbury, the builders.

SCHOOL BUILDINGS, WOLSTANTON.—The Wolstanton School Board have instructed Mr. A. R. Wood, of Tunstall, to prepare plans for a new board school at Wolstanton, and another school at Tunstall—each for about 800 children.

* A. H. Hearn's "Mixed Metals," 1890, p. 55.

* See Breton Symonds, "Geology of Cornwall," 1871, p. 170.





1844
Parliamentary
Illustrated
December 23 1844



Reich. Kath. Kirche, 1864

NEW POLICE OFFICES, ROTHERHAM.—Fifteen Cells, Police and Sessions Courts, &c., together with Municipal Offices and Council Chamber for 45 members, are about to be erected at Rotherham, Yorks, from the drawings and under the superintendence of Mr. Richard J. Lovell, of London, whose plans were selected in competition.

CHURCH, RHOS, PEMBRROKE.—The new church of St. David, Rhoslanerchrugog, was consecrated on St. Andrew's Day by the Bishop of St. Asaph. The church is situated in central Rhos, and is intended for Welsh services. It was designed by Messrs. Douglas & Fordham, architects, Chester, and built by Messrs. Jenkins & Jones, of Johnstown. The Bishop also re-opened St. Mary's iron church, Johnstown. This church has been rebuilt by Mr. Sothorn, of Wrexham, and is intended to serve the English population at Johnstown. The gross cost of the two churches and sites is 2,300.

NURSES' HOME, BURMASTON, LEEDS.—The four corner-stones of the Nurses' Home, which is being erected in connexion with the Leeds Union Infirmary, were laid on the 14th inst. by Mr. Thomas Winn, of Leeds, is the architect. The building will be on the block or wing principle. There are to be forty separate sleeping apartments, located for the most part in the two wings. The matron's rooms will be in the centre, one-story block; and in this portion, too, will be two sitting-rooms, one for the regular trained nurses and the other for the probationers. In a separate one-story block behind the main building will be a kitchen, scullery, and dining-room. The corridors will be fireproof, and at the ends of the two wings iron fire-escapes will be in the walls. The main stairs will be protected by gushing appliances, will also be protected by gushing landings in the building. The total cost, including furnishing, is expected to be rather under 10,000. The contractors are—Messrs. Thompson & Sons, building; Mr. Banks Mawson, joinery and carpentry; Mr. George Thompson, plumbing and painting; Mr. Robert Branton, plastering; Messrs. Walker & Sons, painters; Mr. James Smith, slating; and Messrs. J. & U. Smith, ironfoundry. Mr. T. J. Boothman is the clerk of the works.

DISPENSARY, STOURBRIDGE.—The new dispensary in Worcester-street, Stourbridge, was opened on the 14th inst. The building, which has been erected by Mr. North from plans by Mr. Tom Grazebrook, is of brick, relieved with stone facings and carved bricks.

PROPOSED FREE LIBRARY, NEWCASTLE.—At a recent meeting of the Newcastle-on-Tyne Corporation, a letter was read from Alderman Stephenson, offering to build, at his own cost, a branch free library on the north side of Elswick Park. The offer was accepted. The building will be erected from designs by Mr. J. W. Dyson, architect, of Newcastle, and will provide on the ground floor public restaurant, conversation-room, large reading-room, two ante-rooms, lavatory, &c., and on the upper floor a hall 70 ft. by 35 ft. for branch library and public meetings, and also two small rooms. The estimated cost is about 10,000.

LECTURE HALL, MOUNTPOTTERING, BELFAST.—The new lecture-hall in connexion with the Mountpottering Presbyterian Church, Belfast, was opened on the 14th inst. The hall is a two-story structure, erected at the rear of the church by Messrs. Campbell & Lowry, from the designs of Mr. T. Roe, architect, of Belfast. The hall is of iron, and is of proper, which is on the second story, a minor hall, a committee-room, a minister's room, a library, and a kitchen.

NEW WING, STAFFORDSHIRE GENERAL INFIRMARY.—The new north wing of the Staffordshire General Infirmary at Stafford has just been opened. Mr. Aston Webb, of London, has been the architect, and the builder was Mr. F. Espey, of Stafford. The new building has a total frontage of about 85 ft. to the main street, and is a two-story building, being erected on an under-structure of arches. The front elevation is of red brick and cement stucco, with twelve narrow windows on each floor, 10 ft. 3 in. by 3 ft. The building is connected to the old infirmary by a covered passage, and can be entered also from the grounds at that end by a staircase, whilst at the other end at the rear there is an external winding staircase of iron. There are two wards, one above and one below, 58 ft. by 24 ft., each containing fourteen beds. The wards are 12 ft. high, the ground floor, have been entirely remodelled, while a third, consisting solely of bedrooms, has been constructed. Upon the ground floor is placed the Board-room, the sitting-rooms for the house surgeons, the matron's store and sitting-room, a waiting-room, and a minor accident operating-room, while at the southern end there is a ward, 45 ft. by 25 ft., capable of accommodating thirteen beds. Above this is another ward for twelve beds, and at the opposite end of the building a third for eleven beds. Between these are rooms for the matron and nurses, a single-bed ward, and servants' stores, and a corridor runs the whole length of the floor. Another eleven-bed ward,

called the "Florence Nightingale" ward, is over this, as well as the principal operating-room and two isolated wards. The floors and skirtings of all the wards are of oak. Tola's system for the inlet of fresh air has been adopted, whilst the vitiated air is conveyed from the ceilings of each ward by zinc pipes to the lower, where an up-draught is created by coils of hot-water pipes. Dinner-lifts are attached to each end of the building, the grates are fitted with Dr. Teale's patent for heating the rooms, and the wards are connected by speaking tubes. At the rear a new mortuary has been erected. The contract price was 6,200, but it is estimated that the total cost of the alterations and furnishing will reach 9,000. Altogether 60 beds are provided, and accommodation for twelve nurses. The architects are Messrs. Habershon & Fawcner, London; Mr. J. Chubb, Torquay, was contractor, and Mr. Jackman, St. Marychurch, did the carving.

ST. HUGH'S CHURCH, LINCOLN.—This church was opened by His Eminence Cardinal Vaughan, Archbishop of Westminster, on the 19th inst. The style of architecture is Early Gothic. The walls are of brick, faced externally with Greetwell stone; the inside is plastered, to admit of future coloured decoration. The dressings are of Douling stone; the columns on the exterior and to the nave are of red Corshill stone, the latter having Portland stone caps and bases. There is seating for 500 worshippers. The nave is 87 ft. long, with processional aisle and chapel on each side. The sanctuary is 30 ft. by 30 ft., giving a total internal length of 117 ft. The organ chamber, overlooking the sanctuary, is 21 ft. by 20 ft. The baptistry, sacristies, &c., are suitable to the church. The tower and spire rise 140 ft. The architect is Mr. Albert Vickers, of London, and the builders are Messrs. H. S. & W. Close, of Lincoln.

SAILORS' HOME, ABERDEEN.—The directors have approved of plans for the enlargement of the present Sailors' Institute, in James-street, so as to make it more suitable as a sailors' home. The scheme involves the erection of a new block fronting Mearns-street and the heightening of the connecting wing from one to three stories. According to the new plans, the ground floor will contain a large sailors' café, lounge, smoking, waiting, and luggage-rooms; lavatories, &c., with kitchen and ample accommodation for the keeper. The first floor contains a hall, chapel, and board-room, with retiring-rooms, lavatories, &c.; the second floor, navigation school and class-rooms, eleven private bedrooms for sailors and officers, with bath-room and lavatory accommodation; the third floor contains additional dormitories suitable for shipwrecked crews. The new front to Mearns-street will be built entirely of white granite. The front to James-street will be considerably improved by the addition of large bay windows. The chairman of the directors, who has taken an active interest in the building, is Sir William Henderson. The architect is Mr. James Soutar, Aberdeen.

THE "HUGH MEDDELTON" SCHOOL.—This school, which was opened by the Prince of Wales on the 13th inst., stands partly on the site of iron House of Detention, in Clerkenwell, which was built to replace the old Bridewell Prison in the year 1775, rebuilt in the year 1818, and was further enlarged in 1845. The prison being very old and in a crowded neighbourhood, and subject to many disadvantages, was closed in 1886, and as school accommodation was needed in the locality of the prison, the School Board agreed to ask the Home Office to reserve for sale to them a portion of the site of the House of Detention with a view to the erection of a school upon it. After prolonged negotiations with the Home Office, the Treasury, and also with the Prison Commissioners, the Board succeeded, in December, 1887, in arranging for the purchase of the freehold of the whole of the site of the House of Detention, containing an area of 2½ acres, with all the buildings thereon, for the sum of 20,000. This purchase was completed in June, 1888, and the buildings standing on the site were pulled down in 1890, that portion of the old materials not utilised by the Board being sold for 1,388. 10s. The erection of a school for 2,000 children on this site was sanctioned by the Education Department in January, 1888, the contract price being 41,492. The school is built in three departments—for boys, girls, and infants—each department being on a separate floor, and access to each floor being obtained by two staircases. Each department of the ordinary day school consists of ten class-rooms, with a large central hall, about 70 ft. long by 37 ft. wide, and is fully equipped with cloak-rooms, lavatories, rooms for teachers, &c. The school is heated throughout by low-pressure steam-pipes and ventilating radiators, extracts for foul air being brought from the left. The two lower stories are of the usual London stock brick, with red brick dressings and window arches, the upper stories being of cream-coloured terra-cotta with red tile roofs. The main building is erected upon the foundations of the old prison, some of the cells of which have been preserved intact. The contractors for the building were Messrs. Balfour & Co., Limited, the Architect was Mr. T. J. Bailey, F.R.I.B.A., the Architect to the Board, and the clerk of the works was Mr. J. McKillop. The warming arrangements have been carried out by Mr. John Grundy.

SANITARY AND ENGINEERING NEWS.

WATER SUPPLY, LONGTON, LANCASHIRE.—At the Poor Law Offices, Longton, on the 5th inst., Major-General H. P. Crozier, R.E., inspector of the Local Government Board, held an inquiry into the application of the Rural Sanitary Authority for power to borrow 10,000, for the purpose of a water supply to Howick Hutton, Little Hoole, Longton, Much Hoole, and Penwortham. Mr. Myres, of the firm of Messrs. Myres, Vevers, & Myres, engineers, explained the scheme, which included the laying down of a 9-in. pipe over Penwortham Bridge to Coplane, a 6-in. pipe on to the "Golden Ball Inn," and 4-in. pipes throughout the other parts of the district. The cost of the work would be 9,144. There would be about 3,000 people along the lines of pipes and 595 houses would be served. Witness was of opinion that the water supply would lead to the development of the district as a suburb of Preston. During the proceedings the Inspector remarked that the Local Government Board knew the need of a water supply, and the only surprise was that the Sanitary Authority had not met it. The Clerk said the people of the district were afraid that a water supply would increase their rents, and that was the chief reason the work had not been done. The estimate of the cost was made up by 7,051 for the work, 353, engineer's fees, 740, for contingencies, and 1,000 for an extra main. Bank, Pope-lane and Sheep Hill-lane. Dr. Trimble, Medical Officer of Health for the district, spoke of the urgent necessity for the water supply. He said that in Longton, with a population of 7,000, there were only two wells, one at the brewery, and the other at the house of the owner of the brewery. Mr. Cox said there was already 600,000 gallons of water at Walmer Bridge if people would only look after it. They should take it off the slates. The Inspector: My good man! Rain water in the year 1893! The Inspector afterwards visited the district proposed to be supplied with water.

PROPOSED RAILWAY EXTENSION AT WARRINGTON.—It is expected that the very long delay in the opening of the Manchester Ship Canal, after the first stage in another somewhat large undertaking will be entered upon in Warrington. We (the *Warrington Guardian*) stated some time ago in these columns that the directors of the London and North-Western and the Great Western Railway Companies had under consideration a proposal to expend a sum of 70,000, in alterations at Bank Quay Station, and we now understand that the plans for the work have been approved, and as soon as the award in the arbitration case between the trustees of the late Lord Wimmarleigh and the London and North-Western Railway Company is pronounced, which will be in the course of a fortnight, a commencement will be made.

RADSTOCK WATER SUPPLY.—For several years past the water supply of this little Somersetshire town has been very deficient, and the Local Board, after giving careful consideration to several schemes submitted by the Surveyor (Mr. Martin), instructed him, in February of this year, to prepare plans for a supply by gravitation from Domesday village on the Mendips, situate about seven miles from Radstock. This scheme, after being favourably reported on in April by Mr. J. E. Wilcox, C.E., of Birmingham, was submitted to the Local Government Board. A public inquiry was held on July 28 by General Carey, R.E., and a provisional approval of the works was given following October. The springs are situate on lands belonging to Lord Radstock, who has leased them for a term of seventy-five years. Their height is 666 ft. above sea level, and their minimum volume, as registered in September of this year, was 160,000 gallons in twenty-four hours. The works comprise a small storage reservoir to contain one day's supply, but sufficient land has been acquired to construct a large one when necessary. The main will be just over six miles in length, beginning at 10 in., having an intermediate length of 8 in., and finishing at Radstock with pipes 6 in. in diameter. The distributing mains range from 5 in. to 3 in. in diameter, and comprise a length of over four miles. The head of water in the town will range from 100 ft. to 200 ft. Tenders for the various works were opened on November 24, and, after being tabulated, were settled at a meeting of the Local Board held on December 15. A list of the tenders will be found in another column. The scheme is estimated to cost 10,000, and the district contains less than 4,000 inhabitants.

FOREIGN AND COLONIAL.

FRANCE.—The Municipal Council of Paris has voted a gold medal to be presented to M. Jules Cousin, the founder and curator of the Carnavalet Museum, on his retirement from office.—The competition for the diploma of architecture at the École des Beaux-Arts this year has been an remarkable one. Eighteen competitors have been admitted, and among the works exhibited we may especially mention a design for a clinical hospital by M. Valentin and one for a church by M. de Mourcelles.—An interesting exhibition of photographs of Roman remains in Algeria has been organised at the Trocadéro. The collection, which will be open till the end of the year, was commenced in the first instance to furnish illustrations for M. Albert Ballu's lecture on the architectural remains at

Tebessa, Lambessa, and Timegrad.—The Greek church at Paris, rue Bizet, is shortly to be opened.

M. Bouillon, the sculptor, has just completed the model for the marble bust of Dr. Guillotin, commissioned by the State for the Galerie de la Révolution at the museum of Versailles.—At Pau a statue of Maréchal Bosquet is to be erected, which will be a reproduction in sculpture of the portrait of him by Horace Vernet.—M. Marcel Jacques, the sculptor, is at work on a monument to the painter Millet, which is to be erected at Gréville, Millet's birthplace.—The town of Remiremont (Vosges) has opened a competition for the construction of a theatre, a group of schools, and a gymnasium.—The town of Aurillac has put up to competition the restoration of its Hôtel de Ville and the construction of three school-houses.—At Périgueux a competition has been opened for the construction of a public museum and library.—MM. Pierre Gavault and Bruno Jouve, architects practising in Algeria, have obtained the first premium in the competition opened by the town of Djelfa for the construction of a new Hôtel de Ville.—M. Du Bousquet, chief engineer of the Nord Railway Company, has been elected President of the "Société des Ingénieurs Civils."—The works necessary for deepening the harbour of Toulon will be commenced shortly.—There is talk of transporting to the Place du Panthéon, to form a pendant to the statue of Rousseau there, the statue of Voltaire now at the angle of the Institut. This statue would in that case be replaced by that of d'Alenbert, as a pendant to that of Condorcet which is to be placed at the opposite side. The changes will probably be made in the course of the spring.—A competition has been opened for all architects and engineers of France, for designs for the buildings for the General Industry and Art Exhibition which is to be held at Bordeaux in the spring of 1895.—The members of the Jury of the Section of Architecture in the Ecole des Beaux-Arts, as well as some of the pupils in architecture, have presented a gold medal to M. Ginain, the professor of architecture, to celebrate the fiftieth year since his admission into the Ecole.—The death is announced, at Paris, of M^{me}. Calamatta, *née* Houdon, a talented painter, widow of the celebrated engraver Calamatta.

GERMANY.—Berlin is to have its special technical school for women. According to the plans now before the authorities the managing committee will be made up of lady members, and the curatorship will likewise be put in the hands of a lady. The instructors will, however, at first probably have to be recruited from the other sex.—The average tombstone in the German cemeteries is, as a rule, an eyesore. The Hamburg Arts and Crafts Society has now opened a competition for designs for tombstones of the simplest kind, the cost of which is to range between 15*l.* and 30*l.*—The competition for the sculptural decorations of the new theatre at Wiesbaden has been decided in favour of a design by Professor Volz, of Karlsruhe.—The Bavarian Government has given Messrs. Thiersch and Haubner, the two leading architects of Munich, some valuable decorations in appreciation of their services in the National Museum Competition.—Stettin, on the Baltic, is to have some extensive public sea-baths at a cost of over 10,000*l.* A competition for the design has been opened, with premiums ranging from 50*l.* to 150*l.*—The Vice-Mayor of Berlin, Herr Duncker, has died in his seventy-seventh year, after having served some thirty years in the Common Council. He was intimately associated with the management of nearly all the more important improvements of his city.—There is to be an exhibition of American woodcuts at the Berlin National Gallery. The "Society of American Wood-engravers," according to the *Government Gazette*, has decided to send over the complete exhibit which was shown at Chicago. A number of other contributions are expected.—Cologne Cathedral, which did not receive a new organ at the time of its recent restoration, is now to have one with some 125 stops. Its dimensions will be about 11 metres by 6 metres, with 23 metres height. The funds for it will be subscribed voluntarily.

BELGIUM.—The results of the excavations made by M. Louis Cavens at Mons are now exhibited at the Brussels Museum of Antiquities. The exhibit includes a number of interesting relics of the Belgo-Roman period.—According to the *Belgian News*, a company is being formed in Brussels for the purpose of purchasing the Hôtel des Ventes, on the Boulevard Anspach, and transforming it into an Eden Theatre. If the project is carried out, as there appears every reason to believe that it will be, the works will be commenced at once, so that the opening may take place in May next, at the same time as that of the Antwerp Exhibition. The plans are already prepared, on the lines of the Empire Theatre in London. The direction of the artistic department will be entrusted to Sir Augustus Harris: so we read, but can this be true?

SWITZERLAND.—The international competition for a design of the proposed new Central Railway station at Lucerne has been decided. The first premium was not awarded, the second (3,000 fr.) fell to Herr Mossinger, of Frankfurt, and the third to Professor Stier, of Hanover, both Germans.

MISCELLANEOUS.

SANITARY INSTITUTE EXAMINATION.—At an examination for Inspectors of Nuisances, held at Manchester on December 15th and 16th, forty candidates presented themselves. By permission of the Lord Mayor of Manchester the examination was held in the Town Hall. Written questions were set to be answered on December 15th, from 1 to 4 p.m., and the *visu* voce examination took place on December 16th, commencing at 9 a.m. The following fourteen candidates were certified to be competent, as regards their sanitary knowledge, to discharge the duties of Inspector of Nuisances: John Brooke, Northwich; Eli Bryan, Liverpool; William Cook, Askam-in-Furness; Albert John Davies, Cardiff; Joseph Henry Fowles, Heywood, Lancashire; James Graham, Blackburn; Frank Higginson, Bolton; Jonathan P. Horsfield, Eccles; John Hutton, Kendal; Henry Livesey, Fulwood, Preston; Charles William Marks, Eccles; William John Reid, Belfast; John Terry, Bury; Thomas Waters, Ardwick, Manchester.

STAFFORD AND THE ELECTRIC LIGHT.—On the 13th inst. Colonel W. M. Ducat, R.E., on behalf of the Local Government Board, held an inquiry at the Guildhall, Stafford, concerning the application of the Town Council for sanction to borrow 20,000*l.* for the purposes of electric lighting, and 2,000 for purposes of extending the public baths. Dr. J. Hopkinson, who had been consulted by the Corporation, gave evidence in favour of the scheme being carried out. It is proposed to work the electric lighting apparatus in conjunction with the Gas Works, where the buildings for machinery, &c., would be erected. He thought that the scheme as at present suggested, which would embrace the centre of the town, would cost about 12,000*l.*, but in view of the success of the scheme, which he thought certain, and the increased demands, it would be prudent to make provision at the outset for such extension.

INSTITUTION OF CIVIL ENGINEERS.—At the ordinary meeting of the Institution of Civil Engineers, on the 19th inst.—Mr. Giles, President, in the chair—a communication was read treating the subject of "Hydraulic Power Supply in London," by Mr. E. B. Ellington, M.Inst.C.E. The paper first recorded the considerable progress made in the distribution of hydraulic power during the past five years—the number of machines worked from the system in London having risen from 609 in December, 1887, to 1,755 in December, 1892, and the length of mains laid from 27 to 58 miles in the same period, whilst the available horse-power had increased from 800 to 2,600. A public supply was now given in Liverpool, and works were in progress at Birmingham, Manchester, and several foreign towns. The first pumping-station in London, at Falcon Wharf, Blackfriars, was described by the author in a paper read before the Institution in 1887. Since that time other pumping-stations had been erected at Millbank, near the Houses of Parliament, and at Wapping, near the entrance to the London Docks, while a fourth station was in course of erection at City-road, near the Regent's Canal. The general arrangement of the latter stations was much the same as that at Falcon Wharf, except that at Wapping triple-expansion engines had been employed with a steam-pressure of 150 lbs. per square inch. The water used was obtained at Millbank from the gravel-bed overlying the London clay. Through this bed about 150 ft. of headings had been driven. The water contained iron, which was deposited on exposure to the air. For getting rid of this iron and filtering the water, the Porter-Clark lime-process was employed at a cost of 105*d.* per 1,000 gallons. The average output from the station was 1,500,000 gallons per week. The water at the Wapping pumping-station was obtained partly from the gravel-bed, as at Millbank, and partly from the London Dock. The quantity of iron in the water was much less than at Millbank, and the Pulsometer Company's "Torrent" charcoal filters were used at that station. For the purpose of clarification, "Alumino-Ferric" had been successfully employed. The capacity of the Wapping station was 800,000 gallons in 24 hours. The water used at the several stations was pumped into tanks situated over the engine and boiler-houses by pumps worked by hydraulic pressure. These pumps had proved to be economical machines and possessed the great advantage of being able to work by the pressure in the mains when the main engines and boilers were stopped during the night. The only station worked continuously was that at Falcon Wharf. The total capacity of the accumulators in connexion with the system was 1,600 gallons, while the capacity of the pumping-plant was 3,500 gallons per minute. This showed that the accumulators acted almost exclusively as regulators of the pressure and had little effect in respect of storage. Particulars were furnished of the actual cost of the supply of hydraulic energy for the years 1884 to 1892 under the headings (1) Station and Distribution Expenses; (2) Repairs; and (3) General Charges. In the result it appeared that the amount of the supply was unlikely to affect the working cost favourably to any substantial extent. The experience of the cost of supply in London showed that the total expenses had increased in direct ratio to the total output, added to a constant representing the minimum cost of working the undertaking

irrespective of the output. There was no reason to believe that experience in relation to hydraulic supply in London was likely to differ materially from that of other undertakings established for supplying energy in towns from artificial sources. If works were planned on a moderate scale in relation to the probable output and would allow of extensions as required, the minimum cost of supply would be approximated to within a comparatively short period, and further development was unlikely to exercise any material influence on the cost. The influence of capital expenditure on plant in relation to output was as important as the actual expense in determining the cost at which the consumer could obtain energy. The capital outlay for hydraulic supply in London had fallen from 2*8* per 1,000 gallons in 1885 to 1*1* in 1892, and a further reduction was anticipated in the future.

CHANGE OF ADDRESS.—Mr. Geo. D. Oliver, architect, Carlisle, has moved his offices to No. 5, Lowther-street, Carlisle, where all communications should be addressed in future.—Messrs. Gibson & Russell, architects, ask us to mention that on and after January 1 proximo, their offices will be removed to No. 11, Gray's-in-square, W.C., where they request all communications to them may be addressed.

ASHTON-UNDER-LYME.—The parish church of Ashton-under-Lyme has just received a large four-light window from the studios of Messrs. Mayer & Co., of Munich and London. The window is Perpendicular in style, with elaborate tracery, and the subject selected for representation is the Nativity.

LEGAL.

STEVENSON v. WARD.

THE case of Stevenson v. Ward & Humphrey came before Mr. Justice Grantham and a common jury on Monday, it being an action brought by Mr. William Stevenson, the secretary of the United Builders' Labourers' Union, against Mr. John Ward, the President of the Navvies', Bricklayers' Labourers', and General Labourers' Union, and Mr. A. Humphrey, the secretary of the Union, to recover damages for an alleged libel. The plaintiff's case was that the defendants had published a handbill in March, 1893, which imputed that he had, at the bidding of the Masters' Association, secretly signed an agreement with reference to the payment of labourers who had left their employment of their own accord, which deprived the whole of the labourers of London of a portion of the substantial benefits obtained in the previous June.

The handbill ran as follows:—

FEDERATED UNION. No. 5.

NAVVIERS', BRICKLAYERS' LABOURERS', AND GENERAL LABOURERS' UNION.

REGISTERED OFFICE.—1, Argyle-street, King's Cross, W.C.

TO THE LABOURERS IN THE LONDON BUILDING TRADE.

"Comrades,—We wish to direct your attention to the conduct of Mr. W. Stevenson, General Secretary of the United Builders' Labourers' Union, who, by signing the following agreement of the masters on March 3, 1893, has deprived the whole of the labourers of London of a portion of the substantial benefits obtained in June of last year. His action is the more remarkable for, at a meeting of the London Building Trades Federation, held in February of this year, he positively denied that he had or ever intended to sign such a disgraceful document. Yet a few days later he, at the bidding of the Masters' Association, secretly signed the document he had previously condemned without even consulting any of the important Labourers' Unions connected with the building trades."

The following is a copy of the agreement:—

"Proposed by Rider (builder), seconded by H. R. Taylor, O.B.S. Any workman desiring to leave work during the week shall be entitled to receive his wages at 5 p.m., as provided for by the Rules 5 and 7, subject to his having given the foreman notice before twelve noon."

"Notwithstanding the above arrangement, in the event of more than 10 per cent. of the workmen of each trade employed at the shop or job giving notice to leave during the week they shall not be entitled to receive their money until the usual time on the following Saturday."

Signatures of masters follow.

Signature of W. Stevenson on behalf of the labourers.

The first clause abolishes the one hour and substitutes five hours' notice. The second clause is to place the unions at a disadvantage in a contemplated strike.

(Signed) JOHN WARD, President.
A. HUMPHREY, General Sec."

The defendants pleaded privilege and justification.

Mr. Murphy, Q.C., and Mr. E. Morton appeared as counsel for the plaintiff, and Mr. Cock, Q.C., and Mr. W. M. Thompson for the defendants.

Mr. Murphy, in opening the plaintiff's case, said that in May, 1892, a strike was pending in the building trade, and notices were given by the bricklayers to terminate their engagements. A

conference of masters and men was held, with the result that certain rules were agreed to. While these rules specified the time at which workmen who were discharged by their employers were to be paid their wages, no special provision was made for the payment of the wages of those men who left their work of their own accord. In the following February there appeared in the *Builder* a paragraph stating that it had been decided that a workman leaving his work after having been given one hour's notice was to be paid on the following Saturday with the other men. The plaintiff wrote to the Secretary of the Masters' Association pointing out that he had not given his consent to the contents of the paragraph published in the *Builder*, and on March 3 there was a further conference between the masters and the men to approve additional rules with reference to the payment of workmen who left their employment of their own accord. At that conference the masters proposed that men leaving their work of their own accord should receive their money on the following Saturday; but the plaintiff opposed the proposal, and in the result it was agreed that any workman desiring to leave work during the week should be entitled to receive his wages at 5 p.m. on the day he gave notice, provided he gave formal notice before 12 noon. It was also agreed that in the event of more than 10 per cent. of the workmen of each trade employed at a shop or job giving notice to leave during the week they should not be entitled to receive their money until the usual time on the following Saturday. On March 24 members of the plaintiff's Union held their annual meeting, and on that day the defendants issued a circular containing the alleged libel.

The plaintiff, examined by Mr. Morton, said that in May, 1892, there was the danger of a strike in the building trade, and the bricklayers had sent notices to the master builders saying that they intended to strike, and thereupon a conference took place between the master builders and the bricklayers. There had been also a conference early in May between certain Unions representing the labourers and others in the building trade. He attended the conference of the masters on June 10, and the result of what was taken place, and which was put in as evidence, was correct. The plaintiff's rule for time payments when a man discharged himself. He and some others called attention to that fact at the time of the conference, but they could not make any headway. In the *Builder* for February 11, 1893, there appeared the following paragraph:

"The Council having empowered the Strike Committee to deal with any questions arising out of the interpretation of the new rules, they conferred with representatives of the Operative Bricklayers' Society, the Operative Stone Masons' Society, and the United Builders' Labourers' Union, and it was decided:—

(a) A workman leaving work of his own accord, after having given notice, is to be paid on the following Saturday with the other men, but when a man shows reasonable cause for quitting his employment during the week, it is customary for him to receive a ticket for payment at the yard, but in this case no walking time is allowed.

(b) Ranker masons at work in shops on jobs where there is no walking time, shall be subject to the same rules as such men working at the yard.

On February 17 there was a meeting held of the London Building Trades Federation, and at that meeting attention was called to what was stated in the *Builder* of February 11. The defendant Humphrey was there. He (witness) rose and stated that what he had seen in the *Builder* had taken him by the greatest surprise, and that he knew nothing at all about it, and had not been consulted on the question. He stated then that he should not wish to be in any arrangement by which a man was to give one hour's notice and then wait until Saturday for his money. He wrote to Mr. E. S. Henshaw, the secretary of the Master Builders' Association on the subject, and on the 24th Mr. Henshaw replied, and on March 3 to approve of an additional rule dealing with a workman leaving his employment of his own accord. He laid the letter before his executive society, and it was arranged that he should attend the conference, and he was given instructions as to what he was to do. The proposal made by the man who was to receive his wages on Saturday was not for their money. He (witness) opposed that with all the force of language he could produce at that meeting. He said that the same rule ought to apply whether the master discharged the man or the man discharged himself. The rule as finally proposed and passed at the conference held on March 3 was that a workman leaving his work after having been given one hour's notice was to be paid on the following Saturday. The rule passed on March 3 was not the same rule as had been referred to in the *Builder* of February 11. On March 24 the annual meeting of his Society was held at the Lambeth Baths. At the meeting the operatives of the Society were elected. When the members of the Union came into the room a number of them had the defendants' leaflets in their hands. The man who left the Union on March 3 had not interfered with the rule which provided for a workman leaving of his own accord. He signed the agreement in the presence of everybody there, and not secretly.

Mr. A. Humphrey, one of the defendants, said that the handbill in question was issued without his

knowledge, and he never gave Mr. Ward authority to attach his name to it. He thought that the new rule which the plaintiff had signed had abolished the one-hour notice, and compelled the labourers to give five hours' notice. He believed that its effect would be to place the unions at a disadvantage in a contemplated strike, and that the whole of the labourers of London would lose a portion of the substantial benefits which they had obtained in the previous June.

The Jury eventually returned a verdict for the plaintiff, and assessed the damages at 30*l*.

Judgment accordingly.

ANCIENT LIGHTS.

MR. JUSTICE ROMER ON EXPERT EVIDENCE.

THE case of the London Labourers' Dwellings Society, Limited, v. Hawkrigg and others came before Mr. Justice Romer, in the Chancery Division, on Wednesday, the 20th inst., it being an action brought against the defendants by the plaintiffs, the freeholders of six houses, Nos. 24 to 29, both inclusive, in Watson's-place, Ware-street, Kingsland-road, for an injunction to restrain the defendants from erecting, or continuing to erect, on a piece of land fronting on Wilmer-gardens and buildings so as to obstruct or diminish the access of light to the plaintiff's ancient windows. There was also a claim for damages.

The plaintiff's case was that they had eighteen windows and lights on the ground floor, first floor, and second floor, and two stone windows, all in the rear of the premises looking out into land in Wilmer-gardens, Kingsland-road, and six scullery windows looking westwards also ancient lights, and they alleged that the defendants were erecting a building in Wilmer-gardens which would, if not stopped, materially diminish light and air coming to their (the plaintiffs') windows.

The defence was a general denial of the allegations contained in the statement of claim.

Mr. Cozens Hardy, Q.C., M.P., and Mr. Norton appeared as counsel for the plaintiffs, and Mr. Neville, Q.C., M.P., and Mr. O. Leigh Clare for the defendants.

The expert evidence called on behalf of the plaintiffs was given by Messrs. Charles King Biddell, Ernest Augustus Runtz, Alexander Flemming, and William Froud Young, and that for the defendants by Messrs. Edw. Jas. Gadeny, Henry Cully, and Thomas Batterbury.

His Lordship, in giving judgment, said that there was no doubt that there had been substantial injury to the plaintiffs' lights, and the only question was as to the amount. He had to try and settle that question as a jury would, and he assessed the damage at 240*l*, for which amount he gave judgment for the plaintiffs, with the costs of the action.

His Lordship, during the course of the case, called attention to the very serious discrepancies between the evidence of the plaintiffs' expert witnesses and that of the defendants'. The plaintiffs' witnesses stated that the damage done, in their opinion, to the plaintiffs' premises by reason of the alleged obstruction of light was between 400*l*. and 500*l*. On the other hand, the defendants' expert evidence was that there was no injury of any kind done to the plaintiffs' premises. His Lordship stated that he did not think that such a state of things was very creditable to the profession generally.

A BIRMINGHAM ARCHITECT'S APPEAL.

A CONSIDERED judgment was delivered on Tuesday, the 19th inst., in the Court of Appeal, consisting of Lord Justice Lindley, Lord Justice A. L. Smith, and Lord Justice Davey, in the case of Martin v. Price, it being the appeal of the plaintiff—a Birmingham architect—from the judgment of Mr. Justice Kekewich, who awarded him 120*l*. damages and the costs of the action, which he brought against the defendant for the infringement of his ancient lights. The plaintiff was the lessee of a house in Temple-street, Birmingham, for the unexpired term of twenty-nine years. The plaintiff did not occupy the house himself, but sublet it to several persons. Some of the windows in the plaintiff's house were injured by the building which the defendant was proceeding to erect on the other side of the street. The defendant proposed to erect a building 25 ft. higher than the old house, and when part of the wall of the front building had been erected to 24 ft. 6 in. higher than the old building, the plaintiff commenced an action for an injunction to stop the defendant from erecting a house higher than the old one, so as to obstruct or injure his ancient lights, and the writ also asked for an inquiry as to damages. The motion by consent was treated as the trial of the action. Evidence was taken orally before the learned Judge, and on November 15 he gave judgment for the plaintiff for 120*l*. as liquidated damages and as compensation for the actual and forcible interference with his ancient lights according to the building plans of the defendant. The plaintiff thereupon appealed, his contention being that he was entitled to an injunction, and that the learned Judge had no jurisdiction to award damages in lieu of an injunction in respect of the injury he was likely to suffer if the defendant's building were taken to the contemplated

height. On behalf of the defendant it was contended that the learned Judge (Mr. Justice Kekewich) had jurisdiction to do what he did.

Lord Justice Lindley, in giving judgment, said that the question as to whether the Court had jurisdiction to award damages by way of compensation for an injury not yet committed, but only threatened, was by no means free from difficulty. The question was one of very great importance. In his opinion the plaintiff was entitled to an injunction, and that the order appealed from must be discharged so far as it awarded damages only to the plaintiff, and in lieu thereof the order would be for an injunction to restrain the defendant from building higher than the old building above the level of the street. The costs as to the inquiry as to damages—which would probably be before an official referee—would be reserved.

The other Lords Justices concurring, the appeal was accordingly allowed with costs.

Mr. Warrington, Q.C., Mr. Henshaw, Q.C., and Mr. Mickram appeared as counsel for the appellant, and Mr. Jeff, Q.C., and Mr. Ingpen for the defendant.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

73,615.—MACHINERY FOR SAWING AND BORING TIMBER: G. W. Pearce.—The invention relates chiefly to machinery for sawing to length or width and boring holes for dowels. Two sets of apparatus are used and two sets of boring machinery with a sliding table or support between them.

74,117.—SEATS FOR WATER-CLOSETS: J. Parker.—The seats which form the subject of this patent are made to slide in rails, and have a strengthening piece to prevent warping and to economise cost in manufacture.

74,127.—VENTILATING CUP: C. W. L. Taylor.—This invention consists of a series of cones with outside jackets of various shapes, acting as conductors and non-condensers of air and smoke, enabling the same to retain its warmth and tendency to rise until it has escaped from the shaft into the open air, rendering a down draught impossible.

74,171.—CLOSETS, SINKS, &c.: S. T. Hellyer.—According to this invention the basin proper and the lower portion of the trap is made in one piece, and the back portion in another, the interior of the base receiving the trap portion of the basin. The lower edge of the outside of the basin—that part which is level with the top of the basin portion—is formed with a part which is supported by and overlaps the edge of the base. The lead trap is continued up outside the trap portion of the closet, and is turned over the basin in put in place, its overlapping part sits upon the lead turned over.

74,447.—COUPLING JOINT: T. J. Davis.—The joint, which forms the subject of this patent, is to be used for flexible tubing, and is automatic, i.e., that the flow through the tap or valve must be shut off before the connection can be broken, and the tap or valve must be open when the connection is made. This is done by utilising two or more inclined planes upon the tap or valve in the form of wedges.

74,880.—MARBLE-LIKE PLASTER: R. Baumann (Berlin).—A composition for the production of plaster. The improved process consists in adding silicate of zinc to a mixture of gypsum and lime, whereby the plaster, which is prepared in the usual way, receives a marble-like lustre and appearance.

75,649.—ROOFING TILES: J. H. Olsen and others.—The tiles which are the subject of this patent are square and flat like slates, but one end is furnished with a rib, and the other with a groove, so that the tiles can be laid on the sides form an angle of 45 deg. with the edge of the roof, the laths being laid at the same angle.

75,838.—STRETCH TRAP: J. Barnsteyn.—According to this invention, an elongated opening is made either at the sides or underneath the trap, to clear out the refuse which may accumulate. The lid or cover for this has a groove to receive an indiarubber band, so as to make it watertight when fastened on by wing nuts or screws.

NEW APPLICATIONS FOR LETTERS PATENT.

DECEMBER 4.—23,233, A. and L. Poffley, Glass-glazing.—23,249, E. Hulsehal, Frames and Moulds for making Slag or Granite Bricks, Paviers' Tiles, &c.—23,278, H. Dickinson, Reversible Metallic Lathing and Machinery for producing same.—23,299, W. Eaves, Kilns for burning Bricks, Tiles, &c.

DECEMBER 5.—23,217, W. Bartholomew, Water-closets.—23,350, J. Beckett, Draught and Weather Excluder for Doors and Windows.—23,356, J. Brown and D. Simpson, Window Sashes.—23,357, E. Muntz and others, Adjusting Surveys' Measuring Chains and Steel Tapes.—23,379, H. Burnet, Drain and Soil-testing Apparatus.—23,382, J. Pollock, Securing Windows, Casements, Doors, &c.—23,390, C. Jackson, Opening, Adjusting, and Closing Fan-lights, Skylights, Trap Doors, &c.—23,404, W. Thompson, Preventing the Overflow of Water-closets.

DECEMBER 6.—23,446, A. and R. Knox, Mechanism for Adjusting the Table of Circular Saw Fittings.—23,474, J. Corbett, Ratchet Brace or Attachment to same.—23,475, J. Cutting and H. Bennett, Cure for Smoky Chimneys and Down Draught.—23,485, A. Pearce, Window Fastener.—23,495, J. Bates, Kilns for Drying and Burning Bricks, Tiles, &c.—23,486, A. Pearce, Window Fittings.

DECEMBER 7.—23,522, E. Field, Chimney Top.—23,526, H. Bartlett, Waste-Preventing Cisterns and Syphons for Water-closets.—23,536, J. Gordon, Window Fittings.

DECEMBER 8.—23,608, T. Pennington, Weather Guard for the Bottom of Doors.—23,638, C. Sutcliffe, Tiles for Fireplaces, Hearths, &c.—23,665, C. Pattinson, Preventing Water-pipes Bursting.

DECEMBER 9.—23,729, J. Hay, Window Sashes.—23,748, M. and J. Lander, Fire-grates, Stoves, &c.—23,759, A. Wright, Covering Fireproof Girders.—23,769, S. Smith, Builders' and Decorators' Extension Platform.

PROVISIONAL SPECIFICATIONS ACCEPTED.

23,780, J. Nixon, Automatic Window-catch or Fastener, applicable to Sliding Doors, Panels, Shutters, and Drawers.—23,812, P. Winn, Waste Fittings for Baths, Lavatories,

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Primitives.	Designs to be delivered.
*Drainage Works, &c.	Working Local Board.	500 250 100 and Four of 50 each.	Jan. 31
*Isolation Hospital.	East Grinstead U.R.S.A.	500 300 100	Mar. 17
*Public Hall, Library, &c.	Kirkcaldy T.C.	3000 1500 and 1000	No date
*Two New Fever Hospitals.	Met. Asylums Board		

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Extension of Cemetery.	Kilwinning (N.B.) Parish Board.	Mr. Armour.	Dec. 26
Dwelling-house, &c., 11, Burn-street, Aberdeen.	G. S. of Scotland Ry.	Official.	do
Slater Valley.	Bull. Lanes Cwp.	do	do
Cast-iron Pipes, 1000 yards.	Reichold Cwp.	do	Dec. 27
Red Lodge, Haver, Devon.	Gleason Trust.	do	do
Water Supply Works, Kirgitholm.	Kirgitholm District Comm.	do	do
High-level Road, Walls, &c., at Gasworks.	Boymouth Corp.	T. B. Hall.	do
Rail Works, &c., at Gasworks.	Hargreave Corp.	F. W. Lucy.	Dec. 28
*Baths and Winter Trains.	do	Baggallay & Bristow.	do
Six Dwelling-houses, Captain French Lane, Knoll.	Mrs. Brathwaite.	Jno. Stalker.	Dec. 29
Enlarging the "Bakers Arms," and Business Premises, 2, Duncan-street, Aberdeen.	Phillips & Sons.	G. Rosser.	do
Road Works, &c., Bridge-street.	Alhwick & Canongate Local Board.	G. Wilson.	Jan. 1904
*Isolation Ward Blocks, Wall, &c., Stone Bridge, over River King, Walton.	Toxteth Park Loc. Bd.	F. Price.	Jan. 2
Office, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.	Cumberland C. C.	C. J. Ball.	do
*Erection, Chimneys.	Bute Docks Co.	Official.	Jan. 1
Knitting, Channelling, Draining, &c., Hospital Buildings.	Felixdow & Walton, Ltd., Board.	G. S. Hotten.	do
Sea Wall and Esplanade, Portsea-head.	Bristol Corporation.	J. P. Sturge & Sons.	Jan. 4
Removal of House Refuse.	St. Marylebone Vestry.	do	do
*Renovation of St. Paul's Church.	do	do	do
*Watering Streets and Roads.	do	do	do
Keeper's House, Gouthwaite.	Bradford Corporation.	do	Jan. 5
Gravel, &c., &c.	Comm. of Irish Lights.	do	do
*Beverage Works.	Royal U.S.A.	B. Latham.	do

CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Cast-iron Pipes and Connections.	Leicester Corporation.	A. Colson.	Jan. 6
Street Works.	New Seaford Loc. Bd.	H. J. Hamp.	do
Addition, &c., to School Buildings, near Southend.	Great Stanbridge Sch.	Newman & Jacques.	do
*Works and Materials.	St. George's, Hanover Square.	O. Livingstone.	do
*Making up Roads, &c.	Ilford Local Board.	do	do
*Engine and Pump Room.	Woolwich Local Board.	H. R. Church.	Jan. 8
*Casual Wards.	Poplar Union.	W. A. Hills & Son.	Jan. 10
Dock, Methyl, N.B.	North British Ry. Co.	A. H. Goodall.	do
Road Metal.	Tregony (Cornwall).	J. Hocking.	do
Valves, Shutes, Ironwork, &c.	Highway Board.	do	do
Public Baths, Kirkcaldy-road.	Glasgow Corp.	W. H. Hancock.	Jan. 15
*Pumping Mill.	Leeds Corporation.	G. Hodson.	Jan. 16
Plant Road Metal.	U.S.A. (Wills).	Official.	do
*Steel Pontoon and Alterations to Hammer-smith Steamboat Pier.	London County Council.	do	do
Presbyterian Chapel, Barry.	do	T. G. Williams.	Jan. 17
*Five Houses, &c., for Coast Guards.	Admiralty.	Official.	Jan. 19
*Asylum at Whitestown near Newport.	do	do	do
*School Buildings, Stratford.	Council.	B. S. Jacobs.	Jan. 21
*Boundary Walls, &c.	West Ham.	Newman & Jacques.	Jan. 21
Church Restoration, Caerwys, N. Wales.	Cardiffshire Mutual Bd.	W. C. Way.	Jan. 28
Four Shops and Houses, Greenough-street.	Nottingham Sch. Bd.	W. H. Spaul.	Jan. 31
*Wigan.	do	A. H. Goodall.	No date
Shaft sinking, Arley, Chorley, Lancs.	Blainsworth Colliery Co.	R. T. Johnson.	do
	do	Official.	do

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be made.
*Inspector of Nuisances.	Stroud Local Board.	1000.	Jan. 1904
*Surveyor.	St. Mary Stoke Newington.	3600.	Jan. 5
*Temporary Assistant.	South Gosforth L.C.	2200.	Jan. 6
*Surveyor.	Beckenham Loc. Bd.	2200.	Jan. 10
*Clerk of Works.	Colchester Sch. Bd.	do.	No date

Those marked with an Asterisk (*) are advertised in this number. Competitions, p. iv. Contracts, p. iv, vi, viii, and ix. [Public Appointments, pp. xviii, and xx.]

Sinks, &c.—21,701, P. Wan, Flushing Cisterns, &c.—21,735, J. Ricketts; Spirit Levels—21,737, L. Hill and G. Mackie; Door Springs and Door-closing Apparatus—21,730, J. Dunn, Gravity Button or Hap for securing Cupboard or other Doors—21,735, E. Breeshing, Machinery for Moulding Bricks—21,750, W. Stevenson; Kiln fired from sides or top for Drying and Burning Bricks, Tiles, &c.—21,561, T. Houghton, Sash Fasteners—21,701, A. Boulton, Mortar, &c.—22,227, M. Williams, Cement Mortar, 21,750, T. Johnson, Cleaning Brush—21,753, F. Rumball, Windows with Reversible Sashes—22,275, E. Morgan, Chimney Flues—22,278, F. Pilcher, Construction and Laying Down of Wood Block Roadways—22,293, J. Jacobs, Comp-released Doors for Closet Doors—22,457, P. Winderbank, Draught Excluder for Doors—22,459, R. Robinson, Jack-cutting Tables—22,509, A. Page, Sawing Machines—22,531, A. Clark, Mechanism for Moving or Adjusting Skylights, Fanlights, Windows, &c.—22,551, J. Hewitt, Glazier's Wheel Glass-cutters—22,556, J. Mitchell and W. Morrison, Stoves, Register Grates, and Cooking Ranges—22,521, T. Hull, Silent Draught-preventing Rolling Doors.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months)

22,687, D. Wimbush, an Extensible and Adjustable Scaffold for Building, House Painting, &c.—22,724, J. Gaskell and W. Robinson, Artificial Stone, Bricks, Tiles, &c.—21,172, J. Wilson, Joiner's Cramp—21,274, G. Law, un., Ventilating Device for Sewers.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

DECEMBER 5.—By W. Brady (at Deptford): 13, 14, Whitworth-st., Greenwich, ut. 25 yrs., g.r. 21, 158, 32d, 33d, 34, Clarence-st., ut. 31 yrs., g.r. 31, 35d, 100d, 35, King William-st., ut. 31 yrs., g.r. 31, 115d, 54, 58, Church-st., ut. 31 yrs., g.r. 31, 100, 125d.

DECEMBER 11.—By A. Richards & Co., 4, Caversham-rd., Kentish Town, ut. 54 yrs., g.r. 12d, 1, 53d, 110d, 100, 102, Weedington-rd., ut. 63 yrs., g.r. 12d, 125, 275d.—By Bull, Norris & Hadley: No. 6, Camden-sq., ut. 51 yrs., g.r. 10d, 89d.—By G. A. Wilkinson & Son: 1, 6, 12, 12d, Sandlinds-rd., Fulham, reversion in 80 yrs., 2, 260d, f.g.r. of 24d, Victoria-rd., reversion in 91 yrs., 490d, f.g.r. of 24d, Bull-rd., reversion in 80 yrs., 485d, f.g.r. of 30d, Ragley's Lane, reversion in 91 yrs., 125d, f.g.r. of 30d, Fitzhithers-rd., Peckham, reversion in 80 yrs., 100d, f.g.r. of 15d, 145, Clever-rd., Victoria Docks, reversion in 88 yrs., 2, 91d, f.g.r. of 30d, Arthur-ter., Leyton, reversion in 86 yrs., 49d, f.g.r. of 30d, High-rd., Leyton, reversion in 86 yrs., 35d, f.g.r. of 30d, Arthur-cottages, reversion in 87 yrs., 540d, f.g.r. of 30d, Glover's-cottages, reversion in 87 yrs., 540d, f.g.r. of 30d, King-st., Walthamstow, reversion in 80 yrs., 570d, f.g.r. of 30d, Bedford-ter., Finchley, reversion in 88 yrs., 1, 245d, f.g.r. of 16d, 165, Percy-ter., Harrow, reversion in 88 yrs., 280d.

DECEMBER 12.—By Glover & Harrison: 10, Chippendale-rd., Paddington, ut. 70 yrs., g.r. 8d, 55, r. 50d, 400d.—By Driver & Perfect: 5, Kersley-rd., Stoke Newington, ut. 51 yrs., g.r. 6d, r. 25d, 280d.—By Rogers, Chapman, & Thomas: 46, Upper Manor-st., Chelsea, ut. 8 yrs., g.r. 10d, r. 32d, 110d.

DECEMBER 13.—By H. W. Jenkins: 1, 9, 10, Medcalfe-pl., Pentonville, f. 1, 840d, f.g.r. 1, 1, 100d; the lease of 55, Charlotte-st., Fitzroy-sq., f. 1, 100d; the lease of 55, Charlotte-st., ut. 124 yrs., 100d.—By Hosson, Richards & Co.: 4 to 12 (even), Seagrave-rd., Fulham, ut. 58 yrs., g.r. 15d, 610d, 5, 6, Kewbury-rd., ut. 58 yrs., g.r. 15d, 220d.—By R. Tidy & Son: 34, 38, 40, and 42, Knoll-rd., Wandsworth, ut. 92 yrs., g.r. 28d, r. 228d, 1, 500d.—By T. M. Turner: F.g.r. of 9d, 95, Albion-st., King's Cross, reversion in 58 yrs., 20 yrs., f.g.r. of 10d, 100d, 100d.—By F. Jolly & Co.: 28, Tustin-st., Old Kent-rd., r. 28d, 280d.

DECEMBER 14.—By H. B. Bliss & Sons: 134, Grove-rd., Victoria Park, ut. 34 yrs., g.r. 4d, r. 34d, 385d, 78 to 84 (even), James-st., Bethnal Green, ut. 43 yrs., g.r. 9d, 158d, 440d, By S. A. & P. 125, Avenue-rd., Acton, f. 1, 600d.—By J. A. Jones: 27, Claverton-st., Belgrave, ut. 40 yrs., g.r. 10d, r. 65d, 400d.—By P. Hodson: 16, 17, 18, Grove-st., Edgware-rd., ut. 40 yrs., g.r. 18d, r. 78d, 556d, 19, Northumberland-pl., Bayswater, ut. 52 yrs., g.r. 6d, r. 45d, 345d, 25, Bomore-rd., Notting Hill, ut. 62 yrs., g.r. 4d, 105, 100d, 30, 32, Bomore-rd., ut. 64 yrs., g.r. 9d, 350d.—By Stimson & Sons: Nos. 50, 52, Clapham-rd., f. 1, 100d, 1, 500d, 57, Bromfield-rd., ut. 68 yrs., g.r. 9d, 9d, r. 30d, 450d, 7, The Grove, f. 1, 60d, 800d, 118, High-st., Homerton, ut. 76 yrs., g.r. 7d, r. 39d, 150d, 96, Effra Parade, Brixton, f. 1, 260d, 98, 100, Effra Parade, ut. 68 yrs., g.r. 7d, 375d, 160, Boyson-rd., Waltham, ut. 68 yrs., g.r. 6d, 100, r. 30d, 350d.—By C. C. & T. Moore: 21, Prince-st., Spitalfields, f. 1, 95d, 1, 300d, "Retreat Villa," Canewdon-rd., Southend, f. 1, and plot of land, 560d, 12, 14, 16, Buross-st., Commercial-rd., ut. 33 yrs., g.r. 8d, 55d, 350d, 51, Pekin-st., Poplar, f. 1, 470d, 23, 27, 31, 33, Hawley-rd., Stoke Newington, ut. 80 yrs., g.r. 25d, 45d, r. 12d, 800d, 70, Cranmer-rd., Forest Gate, f. 1, 25d, 370d, 39 to 39 (odd) Iretton-st., Bow, ut. 80 yrs., g.r. 12d, 550d.—By Newby & Co.: 22, Wellington-sq., Chelsea, ut. 36 yrs., g.r. 5d, r. 40d, 205d, 2 to 12 (even), Gledbe-rd., Bromley, ut. 75 yrs., g.r. 60d, r. 150d, 150d, 1 to 8, Florence-rd., ut. 75 yrs., g.r. 24d, r. 200d, 1, 120d, 1, Thornhill Bridge-pl., Caledonian-rd., ut. 18 yrs., g.r. 7d, r. 30d, 200d, f.g.r. of 12d, Ricard-rd., Poplar, ut. 35 yrs., g.r. 5d, 65d.

DECEMBER 15.—By Jones, Lang, & Co.: No. 4, Aldermanbury, two one-sixth shares, f. 1, 92d, 35, 4d, 1, 30d. By G. Trollope & Sons: 2 f. cottages, Great Missenden, Bucks, 200d.—By Moss & Jamison: 4, Cavendish-rd., St. John's Wood, ut. 27 yrs., g.r. 15d, r. 100d, 900d.

[Contractions used in these Lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; r. for improved ground-rent; g. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; c. for estimated rental; ut. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.		TIMBER (continued).	
Greenheart, B.G.	0 0 0 0 0	Satin, Porto Rico	0 0 7 1
Teak, E.I., load	1 0 0 15 15 15	Walnut, Italian	0 8 31
Sequoia, U.S.f.c.	3 3 3 2 6		
Canada, load	0 0 0 0 0		
Birch, do.	0 10 0 10 0		
Elm, do.	0 10 0 10 0		
Pine, do.	0 10 0 10 0		
Oak, do.	0 10 0 5 0		
Canada, do.	0 10 0 5 0		
Pine, Canada, red	0 10 0 5 0		
Do. Yellow	0 5 0 4 0		
Lat. do.	0 5 0 4 0		
St. Petersburg.	0 5 0 4 0		
Wamcott, Riga, do.	0 5 0 4 0		
Odesa, crown	0 5 0 4 0		
Do. 2nd and 3rd	0 5 0 4 0		
Do. 4th and 5th	0 10 0 10 0		
Do. 6th and 7th	8 0 0 10 0		
Do. 8th and 9th	8 0 0 10 0		
Do. 10th and 11th	8 0 0 10 0		
Do. 12th and 13th	8 0 0 10 0		
Do. 14th and 15th	8 0 0 10 0		
Do. 16th and 17th	8 0 0 10 0		
Do. 18th and 19th	8 0 0 10 0		
Do. 20th and 21st	8 0 0 10 0		
Do. 22nd and 23rd	8 0 0 10 0		
Do. 24th and 25th	8 0 0 10 0		
Do. 26th and 27th	8 0 0 10 0		
Do. 28th and 29th	8 0 0 10 0		
Do. 30th and 31st	8 0 0 10 0		
Do. 32nd and 33rd	8 0 0 10 0		
Do. 34th and 35th	8 0 0 10 0		
Do. 36th and 37th	8 0 0 10 0		
Do. 38th and 39th	8 0 0 10 0		
Do. 40th and 41st	8 0 0 10 0		
Do. 42nd and 43rd	8 0 0 10 0		
Do. 44th and 45th	8 0 0 10 0		
Do. 46th and 47th	8 0 0 10 0		
Do. 48th and 49th	8 0 0 10 0		
Do. 50th and 51st	8 0 0 10 0		
Do. 52nd and 53rd	8 0 0 10 0		
Do. 54th and 55th	8 0 0 10 0		
Do. 56th and 57th	8 0 0 10 0		
Do. 58th and 59th	8 0 0 10 0		
Do. 60th and 61st	8 0 0 10 0		
Do. 62nd and 63rd	8 0 0 10 0		
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Do. 68th and 69th	8 0 0 10 0		
Do. 70th and 71st	8 0 0 10 0		
Do. 72nd and 73rd	8 0 0 10 0		
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Do. 78th and 79th	8 0 0 10 0		
Do. 80th and 81st	8 0 0 10 0		
Do. 82nd and 83rd	8 0 0 10 0		
Do. 84th and 85th	8 0 0 10 0		
Do. 86th and 87th	8 0 0 10 0		
Do. 88th and 89th	8 0 0 10 0		
Do. 90th and 91st	8 0 0 10 0		
Do. 92nd and 93rd	8 0 0 10 0		
Do. 94th and 95th	8 0 0 10 0		
Do. 96th and 97th	8 0 0 10 0		
Do. 98th and 99th	8 0 0 10 0		
Do. 100th and 101st	8 0 0 10 0		
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Do. 178th and 179th	8 0 0 10 0		
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Do. 238th and 239th	8 0 0 10 0		
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Do. 242nd and 243rd	8 0 0 10 0		
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Do. 280th and 281st	8 0 0 10 0		
Do. 282nd and 283rd	8 0 0 10 0		
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Do. 290th and 291st	8 0 0 10 0		
Do. 292nd and 293rd	8 0 0 10 0		
Do. 294th and 295th	8 0 0 10 0		
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Do. 298th and 299th	8 0 0 10 0		
Do. 300th and 301st	8 0 0 10 0		
Do. 302nd and 303rd	8 0 0 10 0		
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Do. 310th and 311st	8 0 0 10 0		
Do. 312th and 313th	8 0 0 10 0		
Do. 314th and 315th	8 0 0 10 0		
Do. 316th and 317th	8 0 0 10 0		
Do. 318th and 319th	8 0 0 10 0		
Do. 320th and 321st	8 0 0 10 0		
Do. 322nd and 323rd	8 0 0 10 0		
Do. 324th and 325th	8 0 0 10 0		
Do. 326th and 327th	8 0 0 10 0		
Do. 328th and 329th	8 0 0 10 0		
Do. 330th and 331st	8 0 0 10 0		
Do. 332nd and 333rd	8 0 0 10 0		

PURLEY Surrey.—For erecting the drains and sanitary arrangements at the Wretham Green, Clerk, and Drapers' Schools, and enlarging the end 13½ ft. Mr. J. Kingwell, Clerk, architect. Mr. Edwin S. Manley, surveyor, 17, Hatfield-st., London, W.C.

Co. Grey City & Co. £1,900
Sanitation Co., Ltd. £2,744
North British Plumbing Co., Ltd. 2,700
ard, Thompson, & Co. 3,095
 * Accepted.

QUEENSBURY Works.—For the construction of 10,000 lineal yards of brick and earthenware pipe sewers, &c., for the Local Board of Queensbury, near Bradford. Mr. John Drake, C.E., Water-Inspection.

D. Brook & Sons £18,854 0 0
S. & E. Bentley 12,675 15 0
B. & T. H. Riley 15,910 11 0
E. Kellert 12,590 0 0
J. Moulton & Sons 13,075 0 0
Carforth Bros. 12,154 8 0
H. Hopkinson 13,860 15 0
A. Bland 12,080 8 1
John Simpson 13,800 0 0
E. Balmforth 11,828 16 4
Wm. Small 12,040 0 0
P. Drake 11,098 0 0
C. & R. Tyson 12,080 12 4
Day & Hainsworth 11,200 0 0
J. Charnock & Sons 12,065 0 0
Queenbury 12,000 0 0
 [Engineer's estimate, £17,150.]
 * Accepted.

RADSTOCK.—For the construction of water works for the Radstock Local Board. Mr. T. Martin, Surveyor.

Excavating, Masonry, and Brickwork.

	Including Tunnel.	Excavating.
H. Shallow	£5,594 3 7	£3,660 0 10
J. Bird	3,390 2 6	2,662 9 6
P. Ambrose	4,045 12 7	2,800 10 0
F. C. Caffin	3,733 8 4	2,755 4 7
A. Krauss	3,460 0 0	2,451 15 8
Lloyd & Powell	3,100 15 5	2,437 10 10

Pipe Laying and Fixing Meters, Taps, and Hydrants, &c.

Lloyd & Powell	£1,495 12 2	H. Shallow £899 7 6
E. Colston	1,478 19 3	J. B. F. Green 869 10 0
F. C. Caffin	1,242 14 0	Allen & Smith 754 15 0
P. Ambrose	1,079 8 6	J. Bird 740 0 0
A. Krauss	980 14 9	

Cast-Iron Pipes and Irregulars.

Shaw & Walker	£6,570 9 5	A. Krauss 4,079 0 0
The Walsden Pottery Co.	4,512 2 7	H. Shallow 4,053 12 0
J. Shaw & Co.	4,758 10 0	H. Shallow 4,053 12 0
D. Y. Stewart	4,758 10 0	The Stanton Iron Co. 3,842 15 1
Lloyd & Powell	4,758 10 0	C. Jordan & Sons 3,842 15 1
W. Shaw & Son	4,758 10 0	J. B. F. Green 3,842 15 1
T. Spittle & Co.	4,758 10 0	J. B. F. Green 3,842 15 1
The Clay Co.	4,758 10 0	J. B. F. Green 3,842 15 1

Valves, Hydrants, Reservoir, and other Fittings.

Shaw & Walker	£3,715 15 0	The Glenfield Company £595 8 0
Alley & MacLellan	421 0 0	Hammond & Co. 279 0 0
Kirk & Horsfield	271 0 0	Beck & Co. 238 4 6
J. Stone & Co.	341 0 0	H. Shallow 235 11 0
J. Tyne & Sons	331 4 1	J. B. F. Green 235 11 0
J. Bird	345 0 0	Sons 235 11 0
Lloyd & Powell	393 3 0	

For the Entire Works.

H. Shallow	£3,778 18 7	J. Bird (subject to a deduction of £143) £3,007 9 6
Lloyd & Powell	£819 4 0	

Accepted.

Contract I—Mr. J. Bird, Radstock, including the delivery of cast-iron pipes from the railway-works along the line of works £1,704 9 6

Contract III—Messrs. Cochran & Co., Dudley 3,783 27 3

Contract IV—Messrs. J. Blakeborough & Sons, Brighthelm, including pipe, hydrants, and 3 in. valve, for hydrants and street water-works 270 11 0

Surveyor's Estimate of Contracts I, II, III, and IV. 7,830 0 0

Estimate for delivery of pipes along line of works. 215 0 0

RISCA (Mon.).—For additions, &c., to school buildings, for the School Board. Mr. Geo. Haver, architect, Victoria Buildings, Abercrombie, Quantities by architect.

	Additions, &c.	Re-estimating.
C. H. Reed	£1,100 0 0	£60 12 0
A. Parnell	892 0 0	50 3 0
Newton & Co.	892 0 0	53 0 0
J. Jenkins	348 0 0	36 12 0
J. Walker	892 0 0	53 0 0
My. Pritchard	780 10 0	50 0 0
John Pritchard	740 0 0	48 0 0
I. Colborne	700 17 0	58 10 0
Davies Bros.	697 14 3	64 11 6
Aldridge & Syrett, Newport	625 0 0	34 14 6

** Accepted.*

SEATON (Cumberland).—For the execution of sewerage works, &c., for the Seaton Harbour Sanitary Authority. Mr. Wilson C.E., Clerk, Seaton House, Seaton. Quantities by Engineer.

E. Collins	£725 14 6	J. G. Hurreston £512 0 0
E. Brown	719 6 4	M. Whitney 479 1 6
J. Hunter	697 13 0	L. Ferguson 244 10 0
J. Taylor & Son	697 12 0	Dixon & Nicholson 335 13 0
W. Barrow	697 12 0	Maryport 335 13 0

** Accepted.*

SOUTHAMPTON.—For the construction of a pavilion, Royal Pier, for the Southampton Harbour Board. Mr. J. C. C.E., Clerk, prepared by Mr. E. Cooper Poole, A.M.I.C.E.

C. Shillabeer	£4,172 14 6	H. J. Sanders £3,348 0 0
W. H. Lascelles & Co.	4,021 0 0	Rose & Green 2,995 0 0
Murdoch & Cameron	3,946 0 0	ton (accepted) 2,995 0 0

[Protecting estimate of engineer, £1,500 0 0.]

SOUTHEND-ON-SEA.—For covering east and west side of railway platform on the pier, for the Pier Committee. Mr. C. T. Copley, Borough Surveyor, Clarence-road, Southend.

Baker & Wismans	£216 17 1	F. Dupont, Southend-on-Sea (accepted) £203 0 0
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TAUNTON.—For the construction of the North Town Bridge.

	Mason.	Steelwork.	Total.
Pauline & Elliott	£2,100 0 0	£2,358 0 0	£4,458 0 0
Butler & Co.	5,515 0 0	3,047 0 0	8,562 0 0
Bond & Hitchcock	2,911 3 3	3,950 0 0	6,861 3 3
Finch & Co.	2,635 8 3	3,452 17 0	6,087 15 3
Geo. Double	2,125 19 0	3,452 17 0	5,577 11 9
Gooding	—	—	5,500 0 0
Lysaght & Co.	—	3,522 0 0	3,522 0 0
Pharmax Co.	—	3,912 14 8	3,912 14 8
W. H. Pollard	—	—	5,804 17 10

[Surveyor's estimate, £5,500.]

TREDEGAR (Wales).—For the erection of school buildings, for the Ystradgynodwg School Board. Mr. J. Rees, architect, Penryn.

New Infant's School.

John Rees	£4,579 0 0
Alban Richards, Penryn	2,400 0 0

Alterations of existing Schools.

Alban Richards	£1,700 0 0
John Rees, Ynysybri	1,562 0 0

WHITEFIELD (Lancs.).—For the supply of 700 tons of 7½ in. flag rock sets, 7½ yards second barns flags, 440 yards flag rock kerbs, for the Local Board. Mr. Wm. Skinner, Surveyor, Local Board Offices, Elms-street, Whitefield.

Delivered on the job.

J. Whitaker & Son, Shuttleworth	£9 9 per ton sets.
.....	0 3 5 per yd. flags.
.....	0 2 9 per yd. kerbs.

[11 firms tendered.]

WEDMORE (Somerset).—For the erection of school buildings and teachers' house, Theale, for the School Board. Mr. E. Wall, architect, Wedmore.

Hatherley	£4,447 0 0	F. Merrick & Son £2,398 0 0
Hawkins & Co.	2,770 0 0	F. Hewish, Street, near 2,150 0 0
Wall & Gibbs	2,766 0 0	Glastonbury 2,150 0 0
J. Ford & Sons	2,550 10 1	

** Accepted.*

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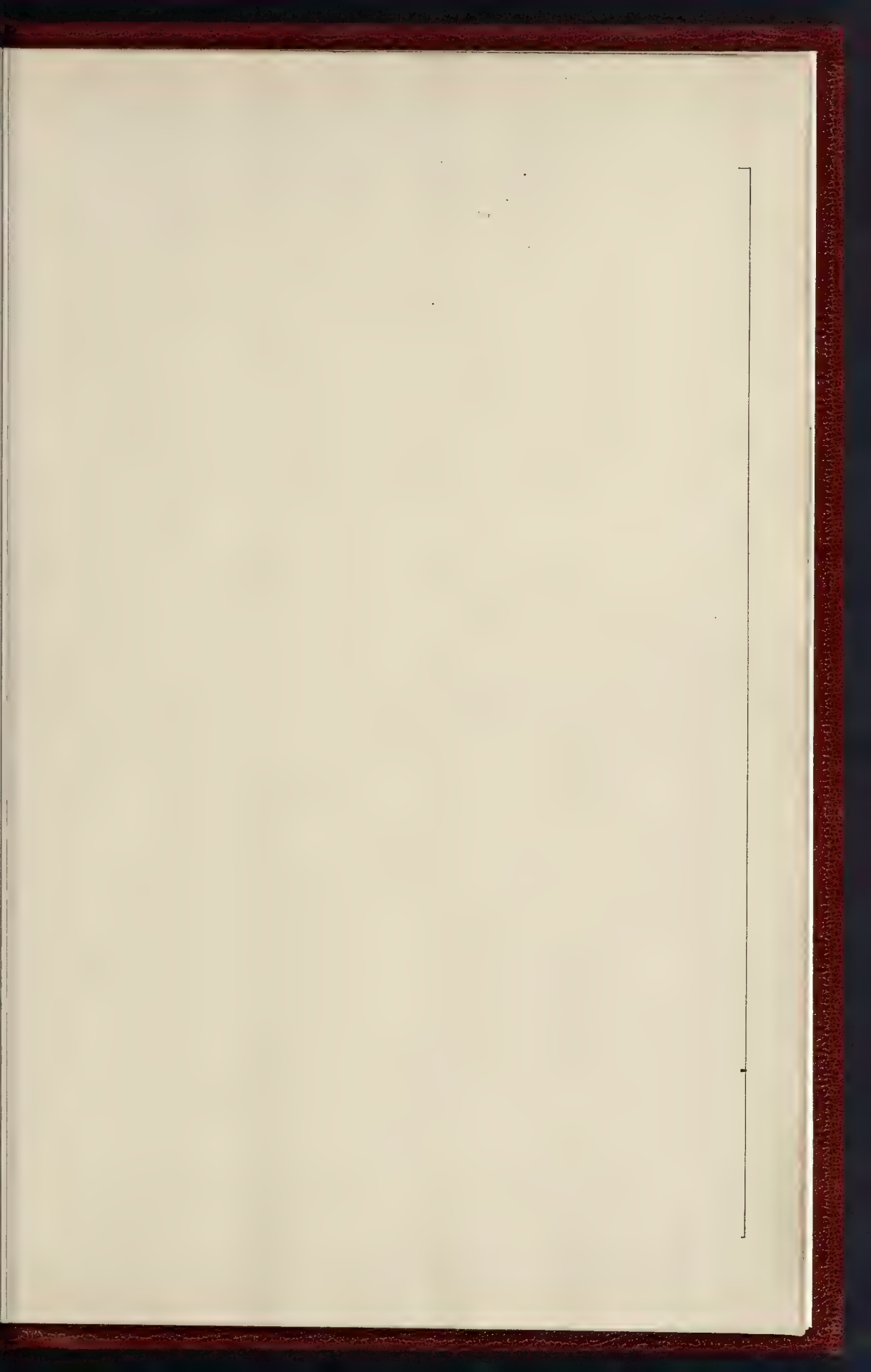
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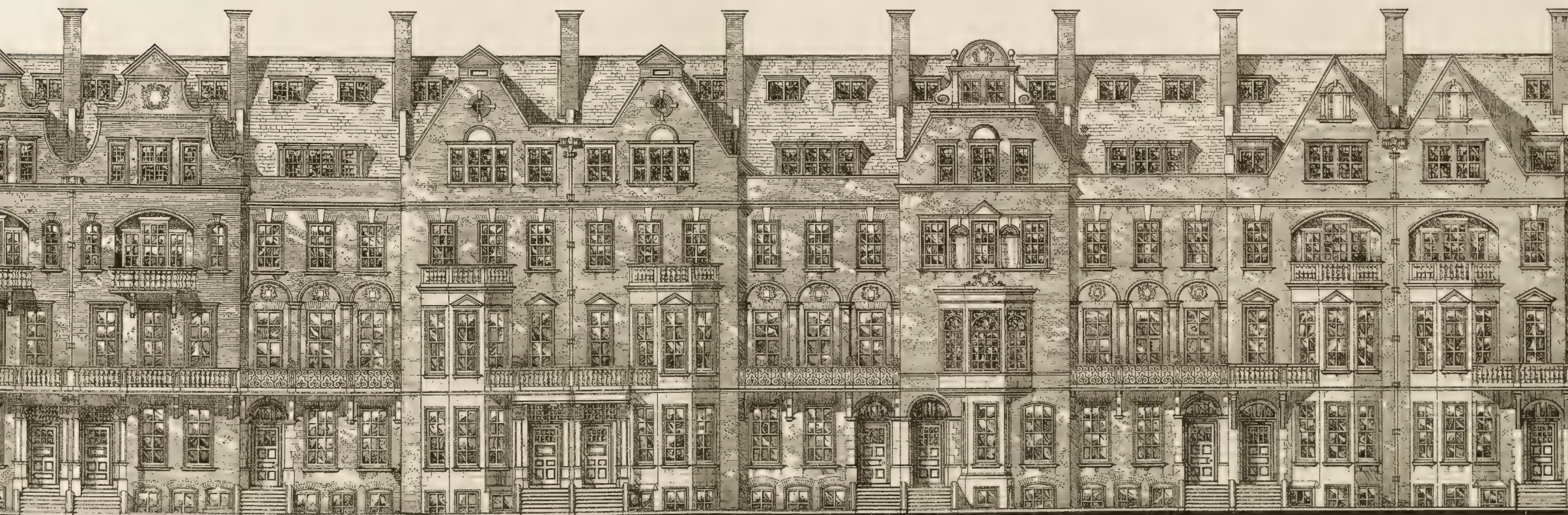
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VOL. LXV. No. 2565.

DECEMBER 30, 1893.

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Houses on the Grosvenor Estate, Buckingham Palace-road.—Mr. J. J. Stevenson, F.R.I.B.A., Architect *Extra Large Photo-Litho.*
Staircase Window, "Rivington," near Manchester.—Designed and executed by Messrs. Heaton Butler & Bayne *Double-Page Ink-Photo.*
Decorations in the Steamship *Gothic*.—Designed and executed by Mr. J. Aldam Heaton *Double-Page Ink-Photo.*

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The Conflict over the Employers' Liability Bill.

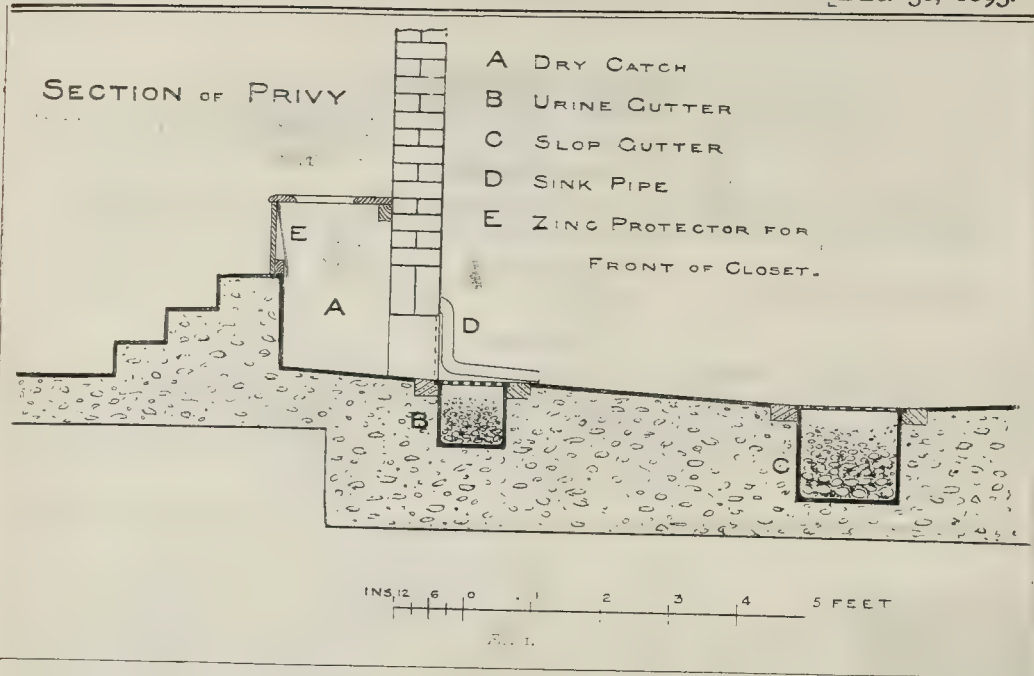


WE have of late had occasion to refer more than once to the Employers' Liability Bill, and we should not return to it were it not that the so-called contracting-out clause has occupied and appears likely for some time to engage so large a share of public attention. This position is, in some respects, to be regretted, because it was essentially desirable that the question of an alteration in the law in regard to the liability of employers for injuries to their workmen should not become a question of party politics. Unfortunately, we cannot disguise from ourselves not only that it has been made a party question, but also that Mr. Gladstone's Cabinet are seeking to make use of the present difference of opinion on the contracting-out clause for the purpose of getting up an agitation against the House of Lords. This journal has nothing whatever to do with party politics, but when we have to regard subjects which are of importance to our readers we must state our views upon them, whether or not they hurt the feelings of party men. At the present moment the fact that the Government have made this a party question, and are using it for their own purposes rather than looking to the good of the community, appears absolutely clear when the facts are impartially reviewed. The House of Commons refused to insert a clause to prevent members of certain existing mutual societies, the funds of which were contributed to by employers and employed, from contracting themselves out of the Act. The House of Lords passed a more extensive clause enabling employers and employed to exempt members of future as well as existing societies from the provisions of the Act under certain safeguards. In other words, a workman was to be enabled to make certain terms with his employer in place of going to law with the latter, if he received an injury not caused by his own neglect. The House of Commons has, at the bidding of the Government, disagreed with this clause, and the Govern-

ment likewise declare that if the clause is retained they will drop their Bill. The Bill without the clause greatly improves the position of the workman; as, for example, by the abolition of the doctrine of common employment; and without the clause the Bill causes a distinct advance in the law in favour of the workman. It is obvious therefore that it would be to the advantage of the workman that the Bill, even without this much-discussed clause, should become law. But what advantage does the Government promise the workman by dropping the Bill if it cannot be passed in its modified form? None whatever; because if it is not passed this session it is highly improbable that it will be passed next session, and if a Conservative Government comes into power it will undoubtedly pass a Bill with a clause in it permitting contracting out. Again, it is obvious that if the Bill were passed in its present form as modified by the House of Lords it is open at any time, if the contracting-out clause proves to be unsatisfactory, to pass an amending Act replacing such clause and preventing contracting out. To the ordinary observer it is incomprehensible, then, why the Government prefer to drop the Bill. The answer is that it is done to create a prejudice against the House of Lords, and to get up an election cry. This is to make the public interest second to purely party advantage. Whether we like it or not, party Government is now a necessary element of our Constitution, but statesmen should endeavour not to allow it to work to the public hindrance. Burke is said to have given up to party what was meant for mankind; the present Prime Minister is making use of party machinery to injure the welfare of the community. For even if we assume that the majority of the workmen of the day are in favour of the Act being compulsory, a large and important minority are certainly in favour of a clause enabling workmen under proper safeguard to contract out of the Act; and the reasonable course under such circumstances would be, at any rate, to allow the present freedom to continue unless and until it is conclusively proved that it is not a real freedom but a spurious one, and that workmen are not strong enough to protect themselves. But if the workmen in the employment of Messrs. Armstrong are satisfied with a freedom to contract out, and can make an arrangement advantageous to the interests alike of

employer and employed, surely it is idle to suppose that workmen in other cases are not also able to protect themselves. No doubt the Government prematurely committed themselves to the view of the trades unionists when they should have taken up the subject in a judicial and impartial spirit, simply and solely with a view to the best interests of employed and employers. On the contrary, they have approached it from an electioneering point of view, and believing that the trades unionists are the strongest body prefer to stick to their guns, hoping that by so doing they will obtain more votes when a general election arrives than if they were frankly and fairly to admit that there exists a difference among workmen as to the right to contract out of the Act, and were to allow a clause to this effect to be inserted in the Bill.

As to the reasons for a clause allowing workmen to contract out of the Act, we have given them so often, and have so clearly declared our view, that we do not propose to refer to them again. Those who have perused this journal from week to week are in possession of them. What we desire now to do is to draw attention to the extraordinary and unfortunate position of the Bill at the present time—a position which, as we have shown, appears to be entirely the fault of the Government, who forget the old and true saying that half a loaf is better than no bread, and who intend to get an electioneering cry, and also, no doubt, because they do not wish to give in to the House of Lords, are prepared to throw away the measure in the form in which it might become law, rather than pass an Act which has been modified by the Peers at the desire of a great number—a minority, it may be, but still an important minority—of the workmen of the country. Again, too, there is this remark to be made: the Bill, if it becomes law without the contracting-out clause inserted in it, will put an end to the existing Societies. Once destroyed, it would not be easy, even if there came a legislative enactment in that direction, to renew them. The harm would have been done. But if the Bill were passed in its modified form, the opinion of the working classes on this point could be still further elicited, and an Act to prevent freedom of contracting out could be passed in the future. We doubt very much whether all the workmen who are



said to be opposed to contracting out really understand the question at issue, nor do we believe that the public, as a whole, yet appreciate the vice of an Act of Parliament which would prevent a man from making a fair bargain with his employer, by which, in place of going to law when he has sustained an injury, and in place of obtaining no compensation whatever if there has been any negligence on his own part, he agrees to be paid a fixed sum in case of injury, whether caused by negligence on his own part or not.

There is also another curious feature about the present position of affairs. Not long ago the Government intervened in the coal strike, and brought employers and employed together. They sanctioned with their approval the establishing of a board of conciliation: in other words, they urged upon masters and men the desirability of entering into amicable relations and negotiations. But in regard to the Employers' Liability Bill they act on quite opposite principles—they prevent masters and men from making friendly arrangements, they endeavour to keep them at arm's length, and they bid the workman go to law in order to extract compensation. If their attitude in regard to the coal strike was right, they should have striven to place in the Employers' Liability Bill a clause which would help to bring together employers and employed, instead of opposing one which has that effect. The objects of party warfare are so great in the eyes of party politicians that the Government, if the House of Lords stand firm, may fulfil their threat and drop their Bill. It is most probable that the House of Lords will stick to their guns; they are fighting for additional freedom, and for the principle of friendly relations between employers and employed, they are supported by a considerable body of opinion among the working classes; and they have, as witness the testimony of Lord Fraser, a strong Radical, in his recent letter to the *Times*, the support of all thinking and reasonable men.

GLASGOW SCHOOL OF ART LECTURES.—The fourth public School of Art Lecture was delivered on the 20th inst. in the West Room of the Glasgow Corporation Galleries by Mr. William J. Anderson, architect, his subject being "The Early Renaissance out of Florence."

SUGGESTIONS FOR THE CONSTRUCTION OF DRY CLOSETS.

By G. V. POORE, M.D.

IN the *Builder* for September 16, 1893, there was inserted a criticism of my "Essays on Rural Hygiene," in which the reviewer, while speaking of the book in a manner that no author could be otherwise than satisfied with, seemed surprised that I should calmly contemplate the necessity of asking delicate persons to go out of doors for the purposes of natural relief.

Now, although I am most thoroughly convinced that the mixing of excrement with water is unscientific, and that it is only a question of time before we see this system absolutely abandoned in new houses, I do not believe that it is necessary to ask delicate persons to run the risk of exposure in houses where dry methods of excrement disposal are employed. If a very small amount of the ingenuity which has been lavished upon water carriage had been devoted to overcoming the difficulties which attend the safe and decent management of dry methods, these difficulties would, I believe, have long since disappeared. If architects and builders can be impressed with the necessity, on scientific, moral, sanitary, and economic grounds, of overcoming these difficulties the thing is done.

Personally, I am deeply impressed with this necessity, and I am glad to have an opportunity of bringing to the notice of the readers of the *Builder* some plans which I have devised for overcoming these difficulties, and which I believe to be satisfactory. The correct principle of dealing with excrement is that laid down by the well-known engineer, Mr. Richardson, of Clifton, and which is given in "Rural Hygiene." The principle is dryness and thorough exposure to the air; and if the sunlight have access also so much the better. I have lately remodelled an old privy on the plan advocated by Mr. Richardson, and have been astonished at the result. This old pit privy was emptied in June last. When it had been previously emptied I do not know. The contents were offensive, and were mixed with a hundred and one things—wire-netting, brickbats, canisters, broken crockery, &c.—which had been thrown down it—"out of sight," and which, as they inter-

fered with tillage, very greatly lessened the practical manual value of the excrement. The contents were superficially buried, and in a very short time they were sufficiently sweet to allow of the undesirable ingredients being got out with a fork, and the ground being properly dug, tilled, and planted.

The pit was filled up level with the ground and the privy-seat was raised 18 in., and an approach to it made with three concrete steps. (See Fig. 1.) The catch below the seat was concreted and cemented, and the floor of it was made to slope towards an outlet 15 in. wide and 12 in. high on the ground level. This outlet was closed by a piece of wire-netting stretched on a frame which could be hung over the opening. The object of this was to prevent the access of animals which feed on garbage, without preventing the access of air. Before the privy was used a little straw was placed on the bottom of the catch and a barrow-load of dry earth was tipped opposite the outlet to absorb the urine, which would flow away down the sloping floor of the concreted catch. In the privy was placed a box of earth and a trowel, so that after the privy had been used a little earth might be thrown through the seat. The earth under such circumstances is really not necessary, and is added more for aesthetic reasons than from any sanitary necessity. This privy, which has been in constant use for the last six months, is as always as sweet as possible. It can be emptied in two minutes with a garden hoe and shovel, and has, in fact, been emptied several times, for whenever the gardener wants a little manure for horticultural purposes, he knows where to go for that which is unsurpassed and which he can obtain and utilize without any offence whatever. The success of this privy has convinced me that the principle upon which it is constructed is sound, and in it, I believe, we have for cottages and small houses the solution of the sewage difficulty. It is a great gain that into such a privy rubbish which hinders tillage is not likely to be thrown, and certainly never should be thrown.

Now such a privy might very well be attached to a house by means of a lobby having cross ventilation, and seeing that a fall is necessary for such a privy, and that it is necessary

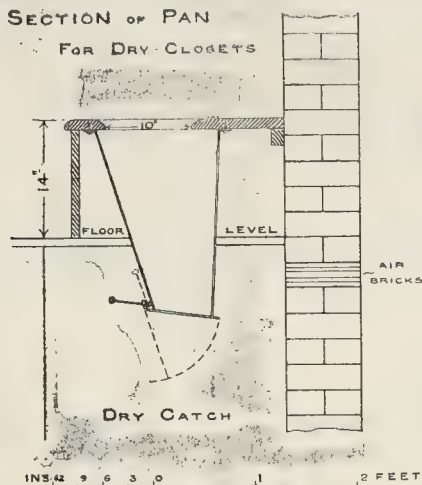


Fig. 2.

to raise the seat, it is obvious that there are advantages in approaching such a privy from the first or bedroom floor of a house.

I need not remind your readers that the angle turret which is so common in Scotch baronial castles is said to have been used for sanitary purposes, the excrement having been allowed to drop on to the ground beneath.

A house which I own at Andover became vacant in the summer, and I have been trying the experiment of giving it a dry privy, which should be of such a kind that no lady would object to use it.

Now I hold that every closet, whether a dry closet or a water closet, should be sequestered from the main structure of a house, and should be approached by a lobby having cross ventilation. Those who in the present day put closets and waste-pipes within the four walls which enclose the living rooms are not abreast of modern civilisation. The simplest plan for effecting my object in the present case seemed to be to throw an arch across the entrance to the stable yard, to place the ventilated passage on the top of the arch, and the closet on the far side of it on a level with the first floor, and with a capacious vault or "catch" beneath it. This has been ably carried out by the architect, Mr. Purkess, and Mr. Annett, the builder. The catch, though larger, is exactly on the same principle as that which has been described, and it has been provided with eight large air bricks, three of which are just below the level of the closet seat, three near the ground level and two intermediate in position. The bottom of the door is some 18 in. above the ground level, and in addition there is an opening for a dust-shoot, protected by a fine grating so as to insure that only dust and ashes and not cinders or clinkers are thrown into it. There can be no doubt that plenty of fresh air will get access to this receptacle. The arch is useful in another way, because the pipe which carries the bed-room slops is on a level with the top of it, and then dips down to deliver the slops in a gutter on the surface of the ground. Thus underground pipes and syphon-bends are rendered unnecessary, and the fall being very great, no freezing can take place in the pipe.

Without special precautions such a closet would be cold and draughty, and I have endeavoured to overcome this difficulty by a specially constructed pan, closed at the bottom by a hinged flap, which opens and shuts automatically by means of a counterpoise. (See Fig. 2).

By means of this specially-devised pan all up-draught is prevented; the stuff drops out

of sight, and the urine, owing to the obliquity of the bottom of the pan, runs away instantly. When the closet has been used, some earth is thrown in, and this has the effect of carrying away any paper which may lodge, and of deodorising any soiling of the pan which may have taken place. There are some points connected with this closet-pan and seat which require to be mentioned:—

1. The seat and accessories are made of the best polished mahogany, because I am very strongly of opinion that smartness leads to cleanliness.

2. The seat is only 14 in. above the ground, which is some 4 in. less than is customary. Closet seats are, as a rule, too high, and the low seat, with the position it necessitates, has certain physiological advantages which, however, can hardly be gone into in detail in your columns. It has one disadvantage, viz., that elderly people find a difficulty in rising, but this objection is easily overcome by fixing a handle in the wall, so that the arms may assist the feeble legs in the act of resuming the erect position.

It will be observed that the back part of the pan is set 3 in. beyond the rim of the seat and is nearly vertical, while the front part is set only 1 in. beyond the rim of the seat, and runs obliquely from above down and from before back. The object of this is to still further lessen the chance of the soiling of the back of the pan. The lower opening is slightly oblique, so that urine shall flow away instantly.

The supply of earth for this closet is kept in a box alongside the seat, and this box is filled from the outside by means of a hopper so arranged that the man who brings a fresh supply of earth cannot see or be seen by any chance occupant of the closet. This, again, is an important trifle.

The pans hitherto constructed on this pattern have been made of japanned iron. They have not to bear any weight or strain, and may be made very light. Enamelled iron or copper seem to me to be the best materials, but I have no doubt they could be effectually contrived in earthenware. The pans have been made for me by Messrs. Righton, 376, Euston-road. The pattern is registered.

To return from the detail of the pan and seat to the principle involved in this method of treating excremental matters. The dry catch as depicted has great advantage over any pail system, because with it one is less absolutely dependent on the scavenger. With the pail system, if the scavenger is

unable from any cause, such as illness, to perform his daily duty, trouble begins to arise instantly, but with the far greater capacity of the dry catch, the accidental absence of the scavenger for a few days, or even a few weeks, is of very little practical importance, because the absence of urine prevents putrefaction and offence. My cottages, as described in "Rural Hygiene," are provided with pails, which are emptied every day. This has answered well, because the garden where the excrement is buried is only a few yards from the cottages; but were I to begin *de novo*, I should adopt the dry catch as the method which not only allows greater freedom to the owner but the one which is probably the most economical. The pail does not allow of that perfect aération which is possible in the dry catch, and as it retains all the urine it is very liable to become offensive if there be any delay in removing its contents, and removal is difficult, because of the sloppiness of the contents. I believe that the dry catch, properly constructed, is admirably adapted for use in towns where dry methods of excrement disposal are in vogue. Where dry methods are in vogue it is essential that the excremental matters should be removed *every day*, and any sanitary authority which intends to adopt such methods must face this fact, and will certainly find that by doing so economy and efficiency are both enhanced.

If the catch be made of a proper curve and slope, and if the scavengers' shovels have a curve to correspond, it is certain that the daily removal of the three pounds weight of excrement, which is certainly the maximum amount of a household of five persons, and its transference to a suitable collecting cart, could be effected in a fractional part of a minute. If, with *daily removal* in view, the privies of city cottages were suitably planned, it is tolerably certain that a scavenger would clear sixty privies in an hour. It has always appeared to me that the pails which are used in big towns are the clumsiest and most unsatisfactory apparatus ever devised for excrement disposal, and that to allow such pails to collect feces and urine for a whole week, until the contents are in a state of putrefaction calculated to poison the *two* unhappy men who are required to manipulate them, is wholly indefensible.

In towns the use of dry earth for absorbing the effluent urine, or for adding to the closets, is, or will be said to be, impracticable. I fancy the best plan would be to allow the floor of the catch to slope to a trough or deep gutter closed at both ends and sunk in the concrete, and filled with absorbent material of which any urban sanitary authority can generally command a supply, such as straw, paper, sawdust, woollen or cotton waste, &c. Such gutters should be provided with a protecting grating, and when the absorbent material will absorb no more, it will have become a most valuable manure and should be removed (see Fig. 1, B). This is a suggestion only, and is a plan which I have as yet had no opportunity of trying.

It goes without saying that the "catch" might be made to receive the dust and ashes of the house, but in such case a grating must be provided to the dust shoot so as to ensure that cinders and other coarse materials do not get mixed with the excremental matters and diminish their practical manurial value. To do this is to increase the difficulty of ultimate disposal. How often the urine gutter would need to be cleared is doubtful. A gutter a foot square in the cross section and 60 ft. long, such as might extend along the backs of half-a-dozen cottages having thirty inhabitants, would have a capacity of 60 cubic ft. or considerably more than 360 gals. The thirty inhabitants would certainly not contribute more than 60 pints ($\frac{3}{4}$ gals.) of urine per diem, or rather more than 50 gals. per week, an amount which would be held in suspension by the absorbent material. It appears probable, therefore, that a weekly removal of the absorbent material in the gutter would be sufficient.

This gutter must be protected from rain. I think the difficulties of removing excremental matters from cities have been exaggerated, and it is certain that they have been intensified by faulty methods. If everything were done, as I have suggested, to facilitate daily removal, I think that one scavenger, with a donkey and small tank upon wheels, might collect from at least 300 cottages per diem, the excrement of 1,500 people weighing about 8 cwt. On this calculation, the daily excrement of 30,000 people would about fill an ordinary 10-ton railway-truck, and if a serious effort were made in such a town as Manchester or Birmingham to dispatch this material direct to the land it would merely mean that fewer railway-trucks would be "returned empty" than at present is the case. To believe that there would be any difficulty in transporting this stuff for any distance and without offence is to hold a very poor opinion of human ingenuity. To this end it must be fairly dry.

It has been said that classification is the basis of all science, and it most certainly is the basis of the scientific disposal of refuse. Refuse matter is most varied in its nature, and the items of which it is composed—excrement, rags, bones, paper, straw, sawdust, and other packing materials, cinders and ashes, old crockery, broken glass, old metal, &c.—all demand a different method of treatment.

When I see the grimy gentlemen in faint-tailed hats engaged in the marvellous operation of climbing over spiked railings with the object of filling a huge lumbering cart with a mixture of some or all of the things mentioned above, I feel that they are engaged in a bit of wilful mischief, and are merely increasing the dangers and difficulties of that sorting which is inevitable. In cities house-refuse should be collected every day, and the sorting should be done at once by the collector, with the intelligent co-operation of the householder. Things dissimilar in nature should never be mixed. The first division is into putrescible and non-putrescible, and the former should be sent forthwith to the farmer to be dug into the ground. The non-putrescible refuse—glass, crockery, cinder, ash, metal—if sorted and temporarily stored in bins would probably pay the cost of its collection and removal and might probably yield a slight return. A great deal of the non-putrescible refuse might be of use to the Sanitary Authority on the spot for making foundations for paths and roads, or for scattering on the streets in slippery or frosty weather. Ash (not cinder) beneath the gravel on a garden path gives in time a firmness and stability which is remarkable. Whether it would work in with the macadam in road-making and cause a similar improvement in the road I do not know. It is difficult to understand why it should not do so. Non-putrescible refuse is not a danger to health, and it is certain that a great deal of it might be used for various purposes by the Sanitary Authority.

This immediate sorting is only possible when such materials are collected every day and the bulk is small.

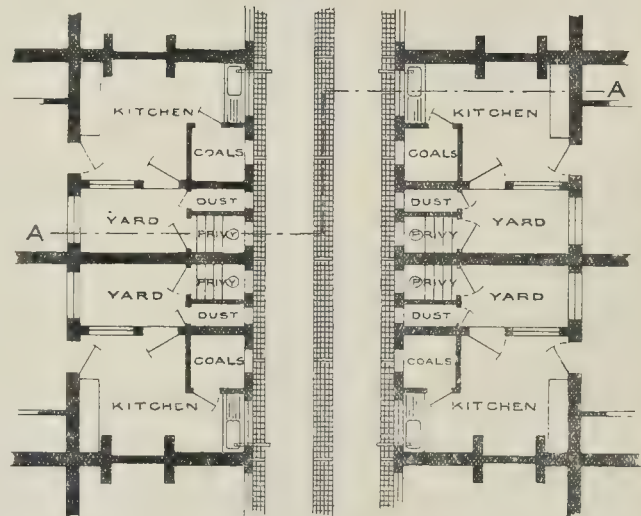
It seems to me that much of our municipal scavenging is too magnificent, and that it is often inefficient in proportion to its magnificence. The nimble boys who collect the street droppings and store them in bins which contain nothing but the valuable and marketable manure are the type of what is good. The clamping showy Clydesdale slowly dragging the most lumbering cart conceivable filled with an unmarketable mixture is the type of what is bad.

Farmers are shy of taking London sweepings because, as one told me, "they send such stuff." All organic refuse is good for the land, but the farmer wants it in a form which does not hinder tillage. Pieces of oil-cloth, hamper lids, dead dogs and cats are a nuisance to the farmer, and a very slight admixture of such things spoils the practical value (a different thing to



SECTION A-A.

Fig. 3.



PLAN

10 8 0 10 20 FEET

Fig. 4.

theoretical value) of the manure which is mixed with them.

What is true of dry, or semi-dry, refuse is also true of liquid refuse. It is the admixture of totally dissimilar things which is, I believe, the main cause of our absolute failure to satisfactorily deal with sewage. In country places where excrement is collected dry it is a very simple matter to filter the house slops and purify them sufficiently to be returned to a stream. The difficulty and danger is enormously increased if the excrement be mixed with the slops. The cry at present is "Tout à l'égout," a cry which is bred of ignorance, moral cowardice, and despair.

In cities where dye-works, tanneries, slaughter-houses, chemical works, and factories of all kinds, are allowed to send their refuse into the rivers, it makes little difference whether the excrements of the inhabitants be added or not, and there are not wanting engineers who urge that in dealing with purely domestic sewage it makes little difference whether or no the excrement be mixed with the slops or otherwise. Engineers who urge this cannot have studied the question in its purely domestic aspects. From practical study of the question I am sure that it makes all the difference. If household slops be unmixed with excrement,

then filtration can be commenced immediately they escape from the house, which is impossible if excrement be mixed with them. This is so easily effected that the householder in suburban country places ought to be compelled to return a clear effluent to the gutters. If manufacturing refuse (strong acids, strong alkalis, chemicals, antiseptics, &c.), be mixed with sewage it is clear that, as a manure, it becomes worse than valueless, and it is also clear that no one method of treatment can possibly purify a mixture which is not the same from day to day or from hour to hour, and the composition of which is scarcely to be guessed at.

The sanitarian who loses sight of classification, and who, in his eagerness for a big scheme, is neglectful of details, has not mastered the elements of his trade.

The only rational treatment for excremental matters is superficial burial, with a view to the production of crops, as detailed in "Rural Hygiene." It is to be hoped that, with this object in view, some Municipality will purchase a tract of land and endeavour to give the poor an object-lesson on the right use of refuse. If convenient access to such a farm by means of canal, river, or railway siding could be obtained, it would make little difference whether it was two or twenty miles from the town. Such a farm

must be hand-tilled, and, if skillfully hand-tilled, would certainly produce as much food as a market-garden. It would employ an enormous amount of labour, and would at least pay its labour bill. I am not advocating that such a farm should be used as a playground for the semi-criminal, semi-idle, and generally incompetent class who go to form the "unemployed"; for the trade of agriculture, to be successful, demands both skill and energy. The "unemployed" should be set to stone-breaking, street-sweeping, dung-collecting, road picking and ramming, and scavenging generally, under the eye of foremen in town, and then, if found worthy, they might be exported to the farm.

Three of the diagrams which accompany this paper are intended to offer a suggestion of a plan to facilitate excrement collection in towns. Fig. 1 gives a section of the dry catch A, and shows the urine gutter B, which should be filled with absorbent material. The waste pipe of the sink has its termination on the far-side of gutter B, and is intended to discharge its contents on the concreted surface which slopes towards gutter C, and which is intended to carry both house-slops and rain-water. Gutter C would be filled with non-absorbent material, stones, broken crockery, broken glass, &c., and would cleanse and purify the slops sufficiently to allow of their being discharged into a stream. It seems far more rational to commence the filtration of slop-water *at once*, by a process which aerates and cleanses it than to take it for miles in dark, airless, underground pipes, and allow it to reach its destination in no better condition than when it started. *Such a process is only possible if the excrement be treated and collected separately.*

Figs. 3 and 4 are intended to show the section and plan of a group of the smallest town tenements, with a scavenger's alley between them and the three gutters, two (B B) to be filled with absorbent material to collect the urine, and one to be filled with non-absorbent material to filter and aerate the slop-water which should always flow in open channels when practicable. The "scavenger's alley" should be protected by gates. It is thought that the excrement would be primarily collected in comparatively small vessels, like garden water-tanks upon wheels. The excrement having been allowed to drain before collection, and being in a semi-dry sticky condition, would have no tendency to slop about during a journey, and in a covered vessel such as I have described, might be sent any distance without danger or offence. Arrived at the farm, the tank would be transferred to a second pair of wheels, and by being tilted would easily deposit its contents in a furrow previously made in the ground with a spade. The tank should be dried and lime-whitened and returned to the town, and three days after the deposit of the excrement in the ground, plants of the cabbage order should be dibbled in.

My thanks are due to Mr. Thomas W. Cutler, F.R.I.B.A., who has kindly made the drawings of Figs. 1 and 2 for this paper from sketches furnished by myself. G. V. P.

THE SELECT COMMITTEE'S REPORT ON RAILWAY RATES.

TWELVE months ago the trading public were just beginning to feel the effects of the new railway rates, the indignation and alarm caused by the prohibitive nature of the advances then made culminating in an appeal to Parliament for the appointment of a Select Committee, "to inquire into the manner in which the railway companies had exercised the powers conferred upon them; and to consider the desirability of adopting any other than the existing means for settling differences between the companies and the public." A very strong Committee was appointed, the majority of the members

being thoroughly well versed in the subject, and their Report has just been issued.

This is a very important and instructive document, and it goes without saying that the original action of the companies is condemned. It is acknowledged on all hands—the railway managers not excepted—that the imposition of the maximum rates at the outset, without any intimation that they were to be regarded as temporary, was a great tactical error. The Committee go further than this, and remark that they feel it difficult to understand fully the explanations afforded by the railway companies, and still more difficult to justify what they do understand of them. These explanations do not, it is shown, correspond with the statements made on their behalf during the progress of the inquiries held for the purpose of determining the maximum rates.

The Central Association of Master Builders of London, in the course of the formal objection lodged by them against the companies' schedules, pointed out that if the proposed maximum rates and terminal charges were authorised by Parliament, the companies would be enabled to make much higher charges than they had for years been making, supporting their objections by tables, comparing the old and the proposed charges on various classes of building materials between representative stations. This, and similar action by other trade associations, resulted in the original proposals of the companies being considerably modified by the Board of Trade, although a margin for contingencies was still left between the old actual rates and the new Parliamentary maxima. The Committee express their opinion that this margin was not given in order that immediate advantage should be taken of it, and that the contingencies which it was intended to meet had not occurred when the companies put the new maxima into operation. The managers doubtless considered that they had discovered a satisfactory solution of the difficulty when they decided to limit all advances to 5 per cent., and it appears highly probable that had they adopted this course at the outset, the Select Committee would never have been called for. There would, of course, have been plenty of opposition, but it would not have been so wide-spread, and would, therefore, have been more easily overcome. The Committee, however, think that it was not the intention of Parliament that the companies should raise their non-competitive rates all round, even by 5 per cent., for the purpose of recouping themselves for reductions of other rates which had been pronounced unreasonable. They give the following highly instructive illustration of the effect of this operation upon the returns of the Great Western Company, who had originally estimated the reduction of revenue caused by the lowering of maximum rates below the old actual rates at 93,000*l.* a year. The effect of the January rates would have been to recoup them by an amount far exceeding the 93,000*l.* a year, but towards the end of March the principle of confining such increases to no more than 5 per cent. of the previous rates was adopted. The traffic of a single day (May 4) was then taken, and from this it appeared that the losses only amounted to 80,000*l.* a year, while the increases of rates on that day were in the proportion of about 50,000*l.* over and above the 80,000*l.* of loss. Further reductions were subsequently made, and from a table of traffic on August 4 it appeared that the increased proceeds of rates were in the proportion of about 14,000*l.* over and above the 80,000*l.* of loss. In other words, the company had raised the rates of one class of traders by 94,000*l.* a year in order to recoup itself for reductions to other traders amounting to 80,000*l.*

This question of recoupment for losses is a most complicated and difficult one, the railway managers having to contemplate it from other points of view than that dealt with by the Committee. For example, the revision

has not simply resulted in increasing the carriage account of one trader and reducing that of another, but in numberless instances the rates charged to one person are variously affected—some charges being raised, others lowered. The reductions are compulsory, *i.e.*, the rates previously charged, being above the new statutory maxima, cannot be maintained; and a trader may quite possibly be a gainer by the revision, even though some of the rates charged to him have been advanced. There would doubtless have been very few indeed whose accounts would show a net gain in this way had the rates of January last been maintained; but with the advances limited to 5 per cent., it would not be surprising if some were now gainers rather than losers, while it is clear that in many accounts showing a net increase the percentage cannot now be so very excessive.

This is fairly open to the objection that the companies should have no right to nullify in any degree the advantage derived through reductions in rates, as the fact that a rate has been compulsorily reduced implies that the original charge was unreasonably high. It would be very irritating, for instance, for a builder who has been paying a very heavy freight on Welsh slates, to find the rates for this traffic at last reduced, and the carriage on deals and ironwork correspondingly advanced. It will be noticed that the Committee speak of the 5 per cent. compromise in a guarded manner, and while not absolutely condemning it, they clearly disapprove of it as a principle or basis of settlement.

As to the desirability of adopting other than the existing means of settling differences, the Committee report favourably of the working of the Conciliation Clauses of the Act of 1883, but recommend some alteration with regard to the Railway Commission. They consider that it will be difficult to justify the continuance of the Commission as at present constituted, that one of the members should be experienced in trade, and that the appointment of the Commissioners should be open to revision from time to time, and should not necessarily carry a pension. This was originally prefaced by the words, "While not prepared to recommend the abolition or reconstitution of the Commission, until some further experience has been had of it, under a more normal condition of things," while more detailed recommendations were also made as to the qualifications desirable in the case of lay members of the Commission. The paragraph was, however, considerably cut down at the instance of Sir Julian Goldsmid.

A close division took place respecting the insertion of a paragraph expressing the opinion of the Committee that traders should be protected against the imposition of unreasonable conditions of transport in risk notes and otherwise. This was suggested by Sir A. Rolitt, and was only carried by a majority of one vote. Some of the new conditions imposed at the commencement of 1893 were decidedly unreasonable, and the mere fact of their withdrawal under the pressure of combined public protest affords no protection for the future, and traders are still naturally apprehensive.


The Committee have referred specially to the terminals question as it affects the owners of private sidings, in which many of our readers will have a practical interest, although they confine themselves to the statement that the companies are not dealing with it in a satisfactory manner. It is noticeable that the paragraph, which reads as follows, was not in the original draft of the Report. "In the course of the inquiry it has been elicited that under the Act of 1883, it is sometimes difficult for traders to obtain from the railway companies proper details of charges for terminals, and that the question of charges for services at private sidings is somewhat obscure." This subject has been before the Board of Trade, in their capacity as mediators between the public and the companies, but without any decision having been arrived at, owing to the legal

issues involved. The Board, have, however, placed on record their opinion that the total charge for siding traffic should not be the same as for traffic on which a station terminal is properly chargeable; but notwithstanding this, the owners of private sidings are experiencing great difficulty in obtaining rebates. It will be remembered that the representatives of the building trades always strenuously opposed the granting of power to charge terminals at all.

The Committee confirm the impression which has been gaining ground as to the Act of 1888 being prejudicial to traders in one important respect. It was, previously, never quite clear whether an appeal would lie against a rate simply because it was unreasonable; but the Report clearly shows that the effect of this Act, whether it was fully contemplated by the Board of Trade and Parliament or not, is to clear up any doubts as to the scope of previous Acts, and to make it certain that no rate can now be questioned at law if within the maximum—except those which are open to objection on the ground of undue preference. It is extremely improbable that Parliament did contemplate such a result, and we gather from the observations made by the Committee that they take the same view. They think that some further step must be taken to protect traders from unreasonable raisings of rates, even within the maximum charges defined by Parliament. They consider that when the Conciliation Clause fails to result in an amicable settlement, the Railway Commission should be empowered to decide whether the increase is reasonable or not.

It seems inevitable that further legislation will have to be undertaken before this troublesome subject can be considered as satisfactorily disposed of, and that some provision must be made to prevent the recurrence of a disturbance such as the trade of the country has been subjected to during the past year.

NOTES.

 NE of the competitors in the Bath Pump-room competition, a well-known architect, sends us the Instructions issued to competitors, drawing our attention to some further points in connexion with this ill-managed business. It appears that a great show was made of affording full information to competitors, by supplying them with lithographed plans, sections, and elevations of the ground and existing buildings, and a couple of photographs; and a paragraph occurs near the conclusion of the instructions to the effect that "the above particulars are considered to be all that is requisite for competitors to be supplied with in order that they may compete, and no other information will be afforded under any pretext whatever." Now our correspondent states that the plans do not fit over one another, the datum line is wrong on one of the sections, and the whole are very badly drawn. But there are directions in the instructions which required further interpretation as to how they were to be construed. "Light must not be interfered with to the excavations beneath the street" was a requirement impossible to comply with literally; possibly that is only a defect of wording. "The position of the ancient walls lately discovered must be in no way interfered with by the new buildings"; what does "interfered with" precisely mean? May they be built on or not? There is nothing to show in the instructions, which are equally vague on one two other points. Meanwhile the Surveyor to the Corporation, who has all this information at his door, draws up the instructions, and then goes in as a competitor himself. It may be some poor satisfaction to the competitors to reflect that the Surveyor has been thoroughly discredited in public opinion by his action; but as matters have been treated, the discredit is reflected on a large proportion of the Town Council also; and this after a quite unusual blowing of trumpets over the

peculiar and unprecedented fairness with which this competition was to be conducted. On other grounds it may be questioned whether the scheme is one which ought ever to have been propounded at all. It is only within the last few days that many people at a distance have realised the fact that these proposed buildings were to be erected over the exceptionally valuable and interesting Roman bath, one of the most notable Roman remains in England, and that all the designs at first selected for premiums make use of the Roman piers to support their substructure. The covering-in of the Roman bath would in itself be a deplorable step, and it appears very doubtful how far the ancient piers would be adequate for this use without treatment which would destroy most of their archaeological value. The best advice we can give to the Bath Town Council is to pay the first premium to the design placed first, to give the second premium to the design placed third (omitting "design O" altogether); to ask Mr. Waterhouse to select the best of the remaining designs for the third premium; and then to defer the whole business till they have time to reconsider whether they were not doing a most foolish thing in covering up the Roman bath, and whether they ought not to carry out their "improvements" on some entirely different lines.

RECURRING to the subject of our article of last week on the "Fall of a Factory Chimney," it may be useful to consider what would have been the result if the chimney had been built either octagonal or circular on plan instead of square. The pressure of the wind on an octagonal chimney is less than on a square one of the same diameter or width, and upon a circular one it is less than on an octagonal, the proportions being 15 : 12 : 10. It must not, however, be forgotten that the weight of the chimney is less in the octagon than in the square, and less in the round than in the octagon, the walls having the same thickness in all cases. Consequently, the moment of resistance offered by the weight will be reduced in like manner. The proportions of the weights are those of the areas of the several bases, and are very nearly as 4 : 3½ : 3¾. Therefore, in order to compare the effect of the wind on chimneys built with square, octagon, and round plans, we must have the moments of resistance in the above proportion. We found before that the moment of resistance of the square chimney was 350,658, consequently that of the octagon will be 292,216, and of the round it will be 275,517. We must also at the same time take the moments of pressure in the proportions of 15 : 12 : 10; the octagon being four-fifths of the square, and the round two-thirds of the square. If we put p_1 for the pressure per square foot on the square chimney, p_2 for that on the octagonal chimney, and p_3 for that on the round one, we have for the moments of pressure $p_1 \times 12,144$, $p_2 \times 9,716$, $p_3 \times 8,096$. Therefore—

$$\begin{aligned} p_1 &= \frac{350,658}{12,144} = 28.87 \text{ lbs.} \\ p_2 &= \frac{292,216}{9,716} = 30.07 \text{ lbs.} \\ p_3 &= \frac{275,517}{8,096} = 34.03 \text{ lbs.} \end{aligned}$$

We see, therefore, that the advantage gained by using either an octagonal or a round plan for a chimney is not so great as would at first sight appear, but in the present case it would most probably have saved the chimney from falling. The chief objection to using any plan but the square is on the score of expense, as there is much more cutting required in building an octagon or round than with the square; and it would be cheaper to give a wider base and a little more thickness to the walls of a square chimney than to use either of the other forms. It was mentioned in the evidence that the chimney which fell had a slight cant in the direction in which it fell, or that it

was somewhat out of the perpendicular. This would reduce the value of the moment of resistance very considerably, as in consequence of its being out of perpendicular a plumb-line dropped from the centre of gravity would fall nearer the outer edge than it would do if it was perfectly upright, and this would reduce the length of the lever arm. Suppose, then, that instead of this arm being 2 ft. 10½ in., as we have previously taken it, it is reduced to 2 ft. 6 in.; then the moment of resistance is 304,920 instead of 350,638, and the value of p is $\frac{304,920}{12,144} = 25.11$ lbs., so that the chimney would be overturned with much less wind-pressure than if it had been perfectly erect. And as it is a very common thing to see tall chimneys more or less out of perpendicular, it becomes an important item in the calculation to take into consideration the amount of this deviation from the vertical line.

THOUGH the German Architectural Competitions are generally well managed, there is still a tendency to give the premiums to the authors of the most showy façades, instead of to the authors of the most practical all-round design. For some time there has been a strong feeling among the leading architects that the present competition arrangements might be modified, so as to prevent this anomaly, and, at the same time, to lessen the expenses constantly incurred by competing architects in the preparation of their drawings. To this end the *Deutsche Bauzeitung* proposes the system of preliminary competitions, open to all, for plans to a small scale, with the main outlines of the sections and elevations only. These preliminary competitions are to be followed by a limited competition between the authors of the best plans, who should receive a reasonable remuneration for the preparation of the more complete designs necessary for the final selection. No premiums are to be given except this remuneration, the successful architect, however, receiving the assurance of having the erection of the building if carried out, or a compensation in case the works, for which he has prepared the drawings, are not taken in hand within a reasonable period. We understand that the Vereinigung-Berliner-Architekten is giving the proposed reform serious attention.

FROM the annual report of Mr. E. Robson, Surveyor to the Willesden Local Board, we learn that a considerable extension of wood paving for roads is being made in that district, though apparently in a rather experimental spirit, and with some doubt, on the Surveyor's part at least, as to the result. He refers to the undoubted drawback to this method of paving in cities caused by "the sickly and unwholesome odours" arising from it in wet weather, though thinking that with the lesser traffic of suburban roads the nuisance is not so pronounced. However, for the present the experiment is being made with several roads in the district. The question of the disposal of road refuse is also touched upon, and the Surveyor suggests that this should be used on land purchased for the purpose, the clay comprising the site being excavated, burnt, and utilised on the roads, and the road grit disposed of in the excavations thus made, burning all the larger particles of vegetable matter and whatever else might tend to create a nuisance or to be insanitary. It is suggested, however, that the opinion of the medical officer should be taken on the point before trying the experiment. The question of drain ventilation comes up in this report, and it is stated that the fixture of vertical pipes and iron columns, from 14 ft. to 16 ft. in height, has greatly tended to lessen the evil of smells from the drains, which are attributed to some extent to the inadequate flush of the two-gallon cisterns. We presume that these vertical pipes "16 ft. high" are in quarters apart

from houses, otherwise this is not nearly high enough. It is complained that great difficulty is found in obtaining the permission of owners to fix these shafts on premises in which they are interested, and that "if only co-operation with the Board were universal on the part of the public, the whole of the sewers in the district could thus be ventilated and the undoubtedly objectionable surface grating entirely abolished." Still we suggest that the height of the pipes is an important consideration, and that whenever they are near to or against houses they must be taken up higher than the highest window, or the last state will be worse than the first.

THE thirty-seventh annual report to the Board of Works for the Hackney District, by their Surveyor, Mr. Lovegrove, is partly of interest in regard to information it gives as to the state of labour in the district. It appears that the expenditure for labour is still increasing, and appears likely to increase, and that in greater proportion than the added lengths of new roads would suggest:—

"Labour Unions also seriously affect expenditure for labour. Workmen are urged to discontent, and naturally in the end they obtain more wages, and to work less hours for the higher pay. It is suggested, however, that the greatest benefit which may result from such endeavour is, by reducing the hours of work, to increase the number of workmen. The hundreds of able and honest workmen applying for work during the year, especially from September to March, is painful to note. . . . The roads in years past have been the refuge of the needy, worn out, and unfortunate men. In the earlier years of your Surveyor's office, workmen were paid 2s. per day. Gradually, on your Surveyor's recommendation, this was increased to 2s. 6d., 3s., and so on, until the present rate of pay, 4s., has been reached; but in these earlier years gangs of outdoor paupers were sent from the Union during the winter season, and formed the necessary addition to the working staff. The proximity of shoots all over the district at that time admitted of truck work partly in lieu of cartage, the trucks being loaded with road sweepings and taken to the shoots, of which there were many. It has been the practice through all the years to add to the staff for winter work, and not infrequently this increased staff has been continued partly through the summer on requirements incidental to special work. However, it appears that many of the surplus labouring men of the district—some of them different from the class of men referred to, and much more able—regard the Board as bound to provide work, and that for all. Of course this cannot be. The problem is a difficult one. The men are too many for the district, and not for this district only, but for many others also, and the matter would appear to demand that some Imperial provision should be made, and that soon, for so serious a necessity. Much good was done by your Board for the Unemployed last winter, in response to the urgent representations by deputations from the Unemployed, but it is a question as to how far this can be repeated."

It is noted that the continuity of the wet season had a most disastrous effect upon the roads, which however gave occasion for the useful employment of a good many men who would otherwise have been without work. This does not appear to have been economical work for the district, however, as the Surveyor calculates that the cost of the same work by contract would probably have been 10 to 15 per cent. less. In regard to underground conveniences the Surveyor suggests very rightly that the Board have made a serious mistake in not providing such accommodation for women as well as men. It is really time that there should be an end of this antiquated prudishness on such a serious matter, and the Hackney Board of Works must be rather behind the age if it cannot recognise this.

THE Budget of the Berlin Municipality for 1894 for the first time includes the long-promised item of 5,000*l.* for works of art to be used in the decoration of the city and its civic buildings. The sum will henceforward be voted annually, and is to be gradually increased in accordance with the development and the financial state of the city. The money is to be specially devoted to the encouragement of the younger artists, the

council of whose representative society made the suggestion for the proposed expenditure. The management of the fund will be in the hands of a special Art Committee, whose members are to be elected from the body of the councillors, and it has been decided that the first work to be purchased will be a gigantic bronze statue of "Berolina," a model for which was prepared by Herr Halmhuder for some provisional decorations on the Potsdam Place when the King of Italy visited Berlin. The statue is to be placed on the Alexander Place, close to the Berlin "Scotland Yard."

IN reference to the subject of window-cleaning accidents, a correspondent draws our attention to the fact that the Glasgow Building Act includes a By-Law providing that "in dwelling-houses, all window-sashes above the ground-floor shall be hinged or constructed so as to admit of the outside of the windows being cleaned from the inside of the apartments." Possibly such a regulation as this will before long be generally adopted in building By-laws. It hardly seems probable that we shall get rid of this class of accidents until some such regulation is enforced; a consideration which will be encouraging to the numerous patentees of hinged and reversible sashes.

IN Dr. Airy's report to the Local Government Board on the sanitary condition of Tenbury, in Worcestershire, we find the combined evils of well water supply and ill-constructed cesspools united, as they so frequently are. We learn that the water supply is drawn exclusively from wells sunk in the immediate vicinity of the dwellings which they supply. On the point of low ground on which Tenbury stands, the sub-soil consists of a bed of clay, four or five feet thick, resting on a bed of river gravel, below which, at a depth of 20 ft. or more from the surface, the well-sinkers reach the sandstone rock. The gravel is full of water, the level of which is found to vary somewhat with the varying height of the water in the river, but is generally found about ten or twelve feet from the surface. From an experienced well-sinker in Tenbury Dr. Airy learned that, in sinking a well, he almost always found the water in the gravel coming in strongly from the west or south-west side, and rapidly rising to a fixed height and no higher, while, by the visible movement of the clear water across the turbid, he could see that the water was passing out as fast as it came in. From this evidence it would appear that the whole body of water in the gravel has a common movement under the superincumbent clay, in a general direction from south-west to north-east. This fact is important, as bearing upon the question of the possible diffusion of dangerous impurity throughout this water-bearing stratum. Along with this, in order to form a true idea of the sanitary condition of the district, we must take the information as to the manner in which the soil through which these wells are sunk is liable to pollution from cesspools. Dr. Airy says:—

"With the exception of a few earth-closets and about twenty-five water-closets in Teme-street, the prevailing form of excrement receptacle is the pit-privy. Some of these bear evidence of having been improved or remodelled within the last few years, but not a few remain unimproved, with large pits extending forward under the floor, difficult to get at, and therefore rarely emptied; or with larger middens at the back—one measuring 7 ft. by 6 ft. by 3 ft., another, 5 ft. by 8 ft. by 3 ft.—and so on. Some are covered, others are uncovered, and in some instances receive roof-drainage as well as direct rain. There seems to have been no uniform rule or system in dealing with these nuisances. With regard to the most flagrant examples, the Inspector of Nuisances assured me that they were then under notice for alteration or reconstruction. This ought to have been done long ago. The emptying of the privy-pits and middens is very irregular, according to the size of the receptacle and the opportunity of arrangement with the farmer who takes the manure. Some are emptied only once or twice in a year. The old brick, uncemented midden pits, allow a leakage of

their fluid contents into the soil beneath. In some cases, probably, this is arrested by the bed of clay in which the pit is sunk, but there must be many cases where soakage takes place into the gravel, and, therefore, as above described, into the general body of sub-soil water which fills the shallow wells."

It is astonishing how constantly we meet with this condition of things in rural districts; water derived from wells sunk into ground abounding in percolating cesspools. It seems to us that some general and energetic action should be taken by Government to put a summary end to this state of things. The report concludes with the recommendation "that the Sanitary Authority should, without delay, take action with respect to the water supply, the unwholesomeness of which as now existing is sufficiently established; whilst the general inaction of the Authority in regard to scavenging, river purification, and regulation of slaughter-houses and dairies is deserving of grave censure."

THE report made to the Local Government Board by Dr. Bulstrode, upon the general sanitary condition of the Borough of Poole, is less unsatisfactory than some reports of the kind, except in regard to one difficulty, which seems to be a constantly recurring one in rural districts, viz., the disposal of excrement. The water supply is reported as good, but in regard to the other question we find that matters are in a very unsatisfactory state:—

"There being no sewers in the borough, the system of storing up excrement on the premises is the one generally adopted. Of this system there are several varieties; in the better class houses cesspools are used; but these are not often, except in new houses, properly constructed, ventilated, or disconnected. In the poorer dwellings the most prevalent method of disposal is by means of a huge privy vault, constructed below the level of the ground. These vaults are lined for the most part with brick, and with the exception of some of those more recently constructed, are not watertight. In the parish of St. James's a very large number of these privy vaults are situated in such close relation to the houses in the courts and alleys that they cannot fail to be both a nuisance and dangerous to health. In some cases the privies located over these vaults are situated immediately beneath windows, and the privy doors open directly alongside the doors of the neighbouring dwellings."

Not only in some cases are these privy vaults of enormous dimensions, but in numbers of them the contents leak out into the surrounding soil. The vaults are emptied when full; and some about which I made inquiries had not been emptied within the memory of the inhabitants of adjoining houses.

In one instance in a house in Strand-street, I was informed by one of the oldest inhabitants that the privy vault, which was situated within 5 ft. of her windows, had been emptied once within the last twenty-three years, but she was unable to remember the exact date. The vault, she also said, was a very large one.

In some cases I was told that at very high tides the privy contents overflowed the vaults, causing, as may be imagined, a great nuisance. Instances of this sort of thing are, it appears, by no means rare in Poole."

THE collection of Hunterian relics at the Royal College of Surgeons in Lincoln's Inn Fields has recently been enriched with an interesting set of drawings illustrating the College and Museum's earlier history, and John Hunter's domestic life. Mr. George Scharf's view of the new buildings for the former shows the Duke of York's Theatre (seen from the north) as it appeared in 1837, being at that day Spode & Copeland's china warehouse, and whose site, to the spectator's left, is now covered by the Museum south-east room. Another drawing, by William Clift—who was Hunter's assistant and first curator, and was instrumental in preserving many memorials of his master—represents the interior, having bays lighted by cupolas, of the original Museum, which had been erected here in 1806-13, after the designs of George Dance the younger and James Lewis, and was removed for Sir Charles Barry's building, begun in 1835. The Museum has since been extended—on one occasion by the demolition, in 1848, of the old theatre, first opened by Davenant in

1662, on the conversion of the Lisle's tennis-court, Portugal-street, but rebuilt, 1714, by Christopher, father of John, Rich, and opened by the son in December, 1714. It is said to be the first of the Theatres Royal at which a guard was mounted. Six years ago the College was enlarged for purposes of the library and laboratories by the addition of two floors, raising its total height to about 80 ft., and by a widening of the front, formerly 108 ft. These alterations were carried out by Messrs. Higgs & Hill, contractors, under superintendence of Mr. S. Salter, architect; but, as some consider, at some sacrifice of the imposing effect of Barry's Ionic portico. There is also a plan, filled in with several personal memoranda, by Clift, of Hunter's home in Leicester-square. The house was No. 12 in Hunter's time, and extended eastwards to Castle-street (No. 13), thus affording space for his lecture-rooms, dissection-theatre, printing-press, and his anatomical collection, which was afterwards acquired by a Parliamentary vote of 15,000*l.* for the College of Surgeons. In the next house, at the sign of the "Golden Head," had lived Hogarth: the site, in the square's south-east corner, is now occupied by the Archbishop Tenison's School-house.

THE historical "Hansahauss" at Antwerp, which has been lately destroyed by fire, was built in 1564 from the plans of the city "architect and sculptor," de Vriendt, better known as "Floris." According to the *National Zeitung*, two-thirds of the cost of the building was subscribed by 167 Hanse cities, and the remaining third by Antwerp itself, the total outlay required being 90,000 *fl.* The block measured 262 ft. by 196 ft., and besides containing space for storage purposes, had some large banqueting and reception halls for the use of the guilds. On the Hanse cities losing their prestige, the building was alternately used for military quarters, as a Protestant church, and again, until lately, as a grain store. Until 1863 the building was still the property of the three Hanse cities—Hamburg, Bremen, and Lübeck. It was then bought by the Belgian Government, and, after 1881, owned by the Municipality of Antwerp.

THE "Carnuntum Association" at Vienna have published in separate form their report of the excavation and examination of the building popularly known in the district as the "Heidenthor." The name is, of course, erroneous; the structure is of Roman origin, and dates about the time of Caracalla (A.D. 211-217). It is, in effect, a *janus quadrifrons*, and makes the tenth of its sort now known. The excavations have shown that the gate still standing was the western portion of a structure which rested on four columns arranged in a square and connected by four arches; above this was a smaller structure, also with four arches. In the centre of the square are remains of a round basis. This supported a standing figure. The whole structure was, in fact, a sepulchral monument, the actual tomb being in the upper portion of the building. The writer of the report, Herr Joseph Sell, thinks that the monument was surmounted by a pointed roof, and reached to about 23 m. in height. The account is fully illustrated by views, plans, drawings of architectural details, &c.

AN interesting paper on the masons' marks on the Abbey Church of Vézelay has been sent to us by M. Adolphe Guillon, the French painter who takes so much interest in the ancient architectural monuments of France. The paper originally formed a portion of the transactions of the "Société des Sciences Historiques et Naturelles de l'Yonne," and contains several sheets of careful drawings of the ancient mason's marks on the Abbey, one of which



Masons' Marks on the Exterior of the Abbey Church at Vézelay.—(From M. Guillon's "Signes ou Marques de Tucherons, Tailleurs de Pierre.")

we give on a reduced scale. This sheet consists of marks existing on the external walls of the Abbey. In the course of his paper M. Guillon draws attention to an exceedingly unfortunate practice, which really goes beyond anything we have heard of in our own country in the way of imitation of Mediaevalism, viz., that when the church at Vézelay was restored in 1840 and 1841, and many of the old stones which were decaying had to be taken out and replaced by new ones, the masons at work on the building were authorised to copy and reproduce on the new stones the masons' marks on the old ones, a kind of falsification of history which is absolutely without excuse, as the marks on the stones had no influence whatever on the design or architectural appearance of the building, and there was not even the questionable justification of restoring the original design. As M. Guillon observes, a century hence these will perhaps be mistaken by archaeologists for Mediaeval masons' marks. One of the workmen at the restoration period, by name Besançon, had however established a very characteristic mark of his own, which could never be mistaken for a Mediaeval one; he marked his stones with a conventional representation of a tobacco-pipe, in two or three different forms.

* For those specially interested in the subject of masons' marks we may mention that M. Guillon's pamphlet is published at the "Imprimerie de la Constitution," 31 Rue de Paris, Auxerre.

THE PARLIAMENTARY SESSION, 1894; AND PROVISIONAL ORDERS.

It is stated that notice has been given for the deposit of 154 Private Bills (England and Wales), showing a considerable falling off as compared with last year's total, which proved to be the lowest for some years past. Having already adverted (the *Builder*, December 9), to the London County Council's measures,* we now give a summary of the more important projects covered by the rest.

Railway Companies' Bills.—Charing Cross, Euston, and Hampstead:—More property, being three houses in Villiers and Buckingham-streets, with a block in the Strand between them, a part (east) of St. Martin-in-the-Fields, churchyard (now a public recreation ground), Nos. 5 and 7, Oxford-street (at the corner of Charing Cross-road), Nos. 118-119, New Oxford-street (adjacent to Meux's Brewery), with portion of the brewery site, six houses at the corner of High-street, Camden Town, and Kentish Town-road, other houses in the High-street (west side, between Wellington and Park streets), and other houses in Melton, Drummond, and Cardington streets, St. Pancras. Midland.—Widening of lines in Camden and Kentish Towns, and substituting a new street from Crowndale-road to Charrington-street, St. Pancras, for that between Phoenix and Goldington streets, authorised by their Act of 1890. Ealing and Harrow. A line from the Metropolitan Railway at Hanger Lane to Northolt-road, Harrow. Manchester, Sheffield, and Lincolnshire.—New lines in York-

* It has been arranged to introduce the Markets Bill into the House as a Public Bill.

shire, and powers to purchase about four acres, bounded by Cunningham-place, the Regent's Canal, St. John's Wood-road, and the Female Orphans' Home, Grove-road, St. Marylebone. Uxbridge and Rickmansworth. — A line from the Great Western branch at Uxbridge to the London and North-Western and Metropolitan Railways at Rickmansworth, passing through Cowley, Hillingdon, and Harefield. London, Brighton, and South Coast. — A line from Earlsfield to South Croydon, through Gatton, Merstham, Coudsdon, and Sanderstead. London, Walthamstow, and Epping Forest. — A line from South-plaice, Finsbury, through Shoreditch, Hoxton, Haggerston, Hackney, Bow, Clapton, Tottenham, Leyton, Walthamstow, Chingford, Waltham Holy Cross, Highbeach, and Epping Forest. South Eastern. — To acquire land and buildings in Lewisham, Appleton, and Deal (facing the Esplanade), in Rotherhithe, Lambeth, Dartford, and Farnborough, and extend time for purchase of lands and completion of certain works in respect of the widening in Lambeth, of Port Victoria pier, and Folkestone Harbour extension (1885). London, Chatham, and Dover purchase of Albion wharf, Holland street, adjoining Blackfriars Station. Great Western — new lines in the counties of Denbigh, Monmouth, Glamorgan, and Wilts, with a branch to Port Talbot; an embankment instead of Olton viaduct, viaducts and embankments in Cornwall, widening and lengthening of several bridges, and amalgamation of the Tiverton and North Devon and Oldbury Railway Companies with their own. Budeleigh Salterton — line from Sidmouth Railway (Tipton St. John's) to Budeleigh Salterton, Carnarvon, Penzance, and South Milford Haven — a line joining the places named. Birmingham, North Warwickshire, and Stratford-on-Avon — a line from Birmingham to Stratford, through Solihull, Tamworth, Henley-in-Arden, Old Stratford, and Shotton. North-Eastern — extension of system in Durham, North and West Ridings, Northumberland, Newcastle, Kingston-on-Hull, and York. A new line from Truro to Newlyn. The Stone, Darenth, and Swanley railway, with a jetty on the Thames, at the river wall. Totnes, Paignton, and Torquay — through the places named on the Great Western lines. Great Northern — new lines at Finsbury Park, and a variety of minor powers. To abandon the following projects: — Shropshire Railways (1888); Hull and North-Western Junction; Brighton, Ringdean, and Newhaven Direct; Worcester and Bromyard (1885); and the Midland Company's southern curve to the Tottenham and Hampstead Junction Railway. **Tramways.** — Bills: Harrow-road and Rad-dington Tramways Co. extension of time now limited by their Acts of 1891 and 1893; West London Tramways Co. new lines in Acton, Fulham, and Hammersmith, and for re-incorporation; London Tramways Co., extend their system in Streatham and the use of mechanical power; Bristol, with electrical, mechanical, or other motive power. Provisional orders: — Croydon, extension of system to Streatham Hill, and from North-end to High-street (when widened); West Bromwich and Handsworth; Dudley and Wolverhampton, and from the latter to Bilston; Liverpool, Bootle, and Walton-on-the-Hill extension, with electrical power; and in West and East Hull, with steam or other mechanical power.

Rivers, Canals, Bridges, Tunnels, and Viaducts. — The Thames Conservancy promote an important measure affecting their duties and jurisdiction as extending from the river's source in Coate's Parish, Gloucestershire, to Yantlet Creek, Isle of Grain. Their Bill consolidates, repeals, or otherwise touches many existing statutes, from 21 James I., cap. 32, to the London Council (General Powers) Act of this year, and alters the present constitution of the Conservators. Of those provisions which fall within our own province we may notice the following: — Extended powers for preventing pollution of the river or its tributaries, with authority to stop up and discontinue the outlets of all sewers, drains, pipes, &c., into the river, and prohibit the placing of any offensive or injurious matter on or near the banks; additional powers for inspection of lands and premises, and regulation, removal, or alteration of any works, farms, buildings, drains, and sewers; to prohibit all bodies and persons from abstracting water in excess of authorised quantities, and control the taking of water by requiring the fixing and maintenance of gauges; to free from tolls and charges and open to the public all piers belonging to the Conservators; for authority to board and inspect all vessels, including house-boats,

and to inspect all vessels with a view to the prevention of pollution and the discontinuance of the flow therefrom into the river of sewage or any other offensive or injurious matter, whether solid or fluid, or water, and to require the making of such alterations and improvements, with the providing of such sanitary fittings and appliances, as they may deem expedient, also with power to prescribe the pattern or description of work needed; the carriage of explosives; removal and disposition of structures and obstructions; to regulate the drawing down and keeping back of water in locks, mills, and other works; removal of accretions or accumulations of mud, weeds, and other matters; regulation of bathing; to prohibit or regulate the exhibition of advertisements and placards and advertising in any form whatever on the river, and also the placing or erection of advertisements, disfigurements, hoardings, or notices on the banks; to reclaim the foreshore from Teddington Lock downwards; and for general powers to the Conservators, and the London and other County Councils, to cleanse, scour, deepen, straighten, or otherwise improve all tributaries, streams, and water-courses that communicate directly or indirectly with the Thames. Appointment of Commissioners for cleansing and purifying the Brent river and its tributaries, the Silk stream, Dollis, Mutton, and other brooks; and enforcement of the Rivers Pollution Prevention Act, 1876, by the West Riding Rivers Conservancy. Sale and transfer of the undertaking of the Leicester and Northamptonshire Union and Grand Union Canal Company to the Grand Junction Canal Company. Flintshire County Council — for a movable bridge across the Dee at Queen's Ferry, with other powers (see also for Cambridge, below). The Channel Tunnel promoters seek for further powers to continue their experimental works, whilst the Channel Bridge and Railway Company propose first to ascertain and determine the practicability of their project, and then to submit its accomplishment to the decision of the Treasury. Their viaduct is planned to start from the Dover and Deal line to St. Margaret-at-Cliffe at a point 475 yards E.-N.-E. from the Low lighthouse, South Foreland, and thence seawards.

Docks, Harbours, and Piers. Bills: — Surrey Commercial Docks — dredging the Thames, enlarging their Greenland and Russia docks, with new canal-locks and entrance from the Grand Surrey Canal into Greenland Dock; a pier about 600 yds. long at Eastham and a jetty at Runcorn by the Manchester Ship Canal Company; a pier, about 1,550 ft. long, from Garth-road, Bangor, together with sundry local improvements, by the Corporation; transfer of Kyde Pier to the borough, with various improvements; enlargement, by four and a-half acres, of the dock by the Swansea Harbour Trustees; and improvement of the Bute Docks. Provisional Orders for promenade pier and extension of the east jetty, Littlehampton; improvement of foreshore and dredging Poole Harbour; new pier at Seaford; new pier at Yarmouth, to extend about 500 yds. from opposite Trafalgar-square; a pier, with pavilions, baths, aquaria, &c., by the Abergele and Pengarn Pier Co., Denbigh. A committee appointed by the Corporation in respect of the Cardiff Harbour Trust have formulated a scheme for acquiring the Bute, Penarth, and Barry Dock properties, with all the foreshore off Cardiff between Penarth Head and Rumney river. Port Talbot Company's — re-incorporation, definition of the port and haulage limits, making a pier or breakwater, about 330 yds. long, from the seaward end of the existing pier. Port Talbot, in Aberavon, and another, about 530 yds. long, from Port Talbot lock, with a dock (330 yds. by 198 yds.) and entrance lock; for various railways to communicate with the Great Western line (see above), and running powers over portion of the Rhondda and Swansea Bay line, these two companies to be empowered to subscribe towards the intended works and to take shares in the capital.

Municipal (including Drains, Sewers, Local Improvements, and Open Spaces). — Bills for transfer to and vesting in the united vestry of St. Margaret and St. John, Westminster, the properties, duties, &c., of the Burial Board for those united parishes, the Commissioners for Public Baths and Wash Houses, and the Commissioners for Public Libraries and Museums; and transfer of the freehold of Westminster Town

Hall, which is now vested in the churchwardens and overseers; extension of time within which the Board of Trade may authorise exercise of powers under the Westminster (Parliament-street, &c.) Improvements Acts of 1887, 1890, and 1892; various local improvements by the Corporations of Gloucester, Cardiff, Bury (with new sewers and sewage works, waterworks, and pleasure grounds), Nottingham, Grimsby, Liverpool, with extension of city boundaries to include, and abolish, the district local boards of Walton-on-the-Hill, West Derby, Toxteth Park, and Waverley; Doncaster Corporation, to keep open for ever, unenclosed and unbuilt over, a portion, about ninety-five acres, of the Town Field; and Cambridge Corporation, for the removal of the law in respect of theatres and public entertainments, revival of powers; to construct bridges over the Cam, and power to enclose Jesus, Butt, and Midsummer Greens; Scarborough — a company to construct a tunnel, 2 furl. 5 ch. long, from Foreshore-road (south side) northwards beneath the town to Royal Albert Drive, at North Bay, thus joining the South and North Sands.

Electrical Light, Energy, and Power. — Application is proposed to be made to the Board of Trade for Provisional Orders to produce, store, and sell electricity by Kensington and Camberwell Vestries, Crystal Palace District Electricity Supply Co. (extension of area), Holloway Electrical Supply Co. to light Guildford; Harrow, and Leyton Urban Sanitary Authorities; Veale & Co., Ltd., to supply St. Austell; Shropshire Electric Light and Power Co. to supply Shrewsbury; the Corporations of Wakefield, West Hartlepool, Barrow-in-Furness, Grimsby, St. Helen's, Chesterfield, Peterborough, Bournemouth, Monmouth, and Plymouth; Crompton & Co. to supply Chelmsford and Swansea; St. Austell Electric Lighting Co. (enlargement of works); Local Boards of Penrith, Buxton, Yeadon, and Willesden; Bedford Electric Light Co. to supply the borough and for new works; Birmingham Electric Light Co. to supply the district, and for similar services in Oswestry, Uttoxeter, and Aberdare; The Plymouth and Stonehouse Gas Light and Coke Co. ask for an Act to the same intent. We may here observe that the Electric Powers (Protective Clauses) Joint Committee for the current session reported that the Board of Trade should make fresh regulations for protecting the electric circuits of other parties and the pipes of gas and water companies, &c., in the case of statutory powers being granted for the use of electricity by tramway and railway companies.

Gas and Water Companies. Bills: — "South-wark and Vauxhall" — new reservoirs at Hampton, Sunbury, and Camberwell (Homestall-road), and cognate purposes; East London — additional storage, reservoirs, &c., in Tottenham, Walthamstow, and Hackney; a gas and water board for Accrington, Rushdon, Clayton-le-Moors, Great Harwood, and Church (all in Lancashire); Gloucester Corporation — new waterworks, the water to be brought from Oxenhill into the city near the Cross; Barnsley Corporation — extension of area for service; Chesterfield Waterworks and Gas Light Company — new reservoirs and works; Swinton Local Board — the well and pumping station to be at Thomas-street, within the lordship; Provisional orders by the Bishop's Waltham Waterworks Company, for Blandford, Tilehurst, Pangbourne, and the district; Bury, and Cardiff (water).

Miscellaneous. — Crown Lands: an Act to change and extend the powers of the Crown Lands Act, 1866, and alter the Crown Lands (Scotland) Act, 1835, in respect of the granting of lands; and to transfer from the Archbishop of York (or his successors) and the Woods Commissioners, to the Ecclesiastical Commissioners the Sunk Island Chapel in the River Humber, together with all existing trusts connected with that chapel, the parish church, Newborough, Northants, and Portland, Oxford, and Welbeck Chapels, London. The Common Council promote a Bill which concerns, more or less, all inhabitants or owners in the City; they propose that the City of London Police shall be entitled to claim pensions after twenty-five years' service, irrespectively of age, and to prohibit or restrict all assignments or charges upon superannuation allowances. The force consists of 1,050 constables, their pay is 91,085*l.* a year, and pensions 13,593*l.*

^e We cannot find this portion of the Bill in the notice of the "National Society for Checking the Abuses of Public Advertising."

^f The Canal will be opened on January 1 from Eastham to Manchester, thirty-five miles, with a procession of vessels headed by the sailing-ship, *Sophie Wilhelmina*.

PROPOSED SCHOOLS, BURSLEM. — The Burslem School Board are about to build a new school at Jackfield, for 800 children, for which plans are being prepared by Mr. R. A. Wood, of Tunstall.

Illustrations.

HOUSES ON THE GROSVENOR ESTATE,
BUCKINGHAM PALACE-ROAD.

THE drawing shows the elevation of a row of houses in course of erection by Mr. Willett, ten of which have been recently completed. The material is red brick, with the porticoes, balconies, and dressings in Portland stone. The ground and second floors are constructed with fireproof materials. The houses have the usual accommodation, disposed so as to give ample light, and air throughout. The aim in the elevation has been to give individuality to each house in conformity with the general design.

The architect is Mr. J. J. Stevenson, who has done so much towards the improvement in recent years of the treatment of London street houses. The drawing was exhibited at the last Royal Academy Exhibition.

THE STAIRCASE WINDOW AT "RIVINGTON," FENDLETON, MANCHESTER,
FOR MR. ALFRED PILKINGTON.

THE constructive framework of this window as well as all the adjacent arches, pillars, pilasters, and strings, is of red terra-cotta, which makes an admirable setting for the glass. The general idea of the subject is Mr. Pilkington's. Then sketches were made by Messrs. Heaton's draughtsmen. These sketches, after criticism and correction by Mr. Pilkington and his architect, developed into the full-size cartoons, which, after a like process of revision and correction, were put into glass.

The design may thus be considered as that of Messrs. Heaton, Butler, & Bayne, subject to the criticism and revision of the architect, in whose name the drawing was exhibited at the last Royal Academy exhibition.

DECORATIONS IN THE STEAMSHIP
GUTHIC.

THE degree of trouble and expense gone to in these days in the interior fitting of first-class passenger steamships is a remarkable contrast to what used to satisfy the last generation; and it is gratifying to find that in some instances at least there has been an attempt to be artistic as well as sumptuous. The illustrations we give of the work carried out in the *Guthic*, a recently completed vessel, by Mr. J. Aldam Heaton, form only a very small portion of the amount of decorative work, all of a good class, which has been lavished on the interior of this ship.

We give illustrations of the friezes of the smoking-cabin and library, of some carved panels in the library, and of some of the marquetry work on the fronts of the book-cases.

QUEEN'S HALL, LANGHAM-PLACE.

WE have referred already to the fact that there has been a dispute between Mr. C. J. Phipps and Mr. T. E. Knightley as to which had the claim to be called architect of the new concert-hall in Langham-place. They prepared the design jointly in the first instance, representing separate promoters but agreeing to work conjointly, Mr. Phipps preparing the plan and Mr. Knightley the elevation. Mr. Phipps's client eventually dropped out of the concern, and Mr. Knightley became architect for the building, which in plan was carried out mainly on Mr. Phipps's scheme. Mr. MacVicar Anderson has published his award; we cannot find space for it in detail, but the summary is—"That, subject to a few variations, the building known as the Queen's Hall, Langham-place, has been erected from plans, as distinguished from elevations and sections, which were designed by Mr. C. J. Phipps, and that the design of the exterior and interior in other respects, as well as the successful completion of the hall, is due to Mr. T. E. Knightley, under whose sole superintendence the building has been carried out."

On the facts as recorded in the award, we quite concur in the decision.

THE SLATE TRADE.—Prices for the coming year have been arranged. In both the Carnarvonshire and Merionethshire quarries they have a strong upward tendency, especially for small sizes. In spite of the depression in other trades, demand is good and likely to continue so as the leading quarries have orders in hand for some months to come.

THE HORNIMAN FREE MUSEUM.

THIS interesting museum, which is situated in the London-road, Forest Hill, was re-opened, after re-arrangement and extension, on Bank Holiday. The museum consists of twenty-two apartments, and contains many objects of interest and value which Mr. F. J. Horniman, its founder, has been collecting for over thirty years, and which he exhibits free to the public on Mondays, Wednesdays, and Saturdays.

In the Reception-room, amongst other notable objects are a fine Japanese cloisonné enamel vase from Nagoya, which is 5 ft. in height by 7 ft. 6 in. in circumference, and some good decorative panel-work. In fact, in the applied art section of the museum much panel-work is shown, including examples of metal-work, ivory inlaying, and lacquer, while some curious and clever pieces of wood and oak carving are to be seen. Room 4, an Elizabethan bed-room, has been furnished entirely in the old English style, with carved oak bedsteads and cabinets, and broad chimned fireplace, while on the walls are paintings in imitation of tapestry, representing Old London Bridge. A case in this room also contains some old English locks, keys, &c., and in the next chamber are some specimens of old German wood-carving. A collection of musical instruments is contained in the museum, including an automatic orchestral organ, which on Tuesday was kept "going," presumably for the benefit of the holiday public.—a favour which, we are inclined to think, many of them could have dispensed with, inasmuch as the walls of the apartment containing the instrument are not sound-proof, and the monotonous repetition of tunes could be heard in different parts of the building.

Amongst other interesting rooms are the Old English Parlour, the Oriental Figure Room (containing several life-sized figures, clad in picturesque Oriental dresses, but shown in an inadequately ventilated and pokey apartment, with a sloping roof, and therefore not to be seen with or to advantage); the Gallery of Antiquities (with Græco-Roman bronzes and terra-cotta figures; Cyprian pottery and glass found at Paphos, and a series of plaques restored from the Phigalean and Parthenon friezes); the Ancient Urn Room (containing Græco-Roman mosaics), the Egyptian Mummy Room, Indian Rooms, and the Oriental Gallery. In the Indian rooms are shown fans, lacquer, cloisonné enamel, wood carvings, gold, silver lace, models in wood and clay, &c. On the walls of these rooms are large panels of Japanese embroidery. The Oriental Room, principally devoted to examples of Oriental Mythology and Pantheon, contains large and small-seated figures of Buddha; Buddhist shrines; a model of a Japanese Buddhist priest, and numerous Indian divinities, the elephant-headed Ganesa, the god of Prudence, and a wooden idol from the Nicobar Islands. There are also some examples of Indian and Bidri ware, inlaid silver or pewter.

At the entrance to the Museum from the back is a fine carved Indian archway from Jeypore, which is said to have occupied six men more than seven years in continuous labour. It is an elaborate piece of work, but, unfortunately, perhaps owing to its size, it has been placed where it needs to be protected from the elements, and with this object in view a light-glass framework has been placed over it, spoiling its effect from the outside, where the combination of elaborate Indian carving and cheap English glazing looks absurdly incongruous.

Most of the other rooms are devoted to Natural History objects. In the Ethnographical Saloon there has been added a collection made by Sir Somers Vine, who opened the building on Tuesday.

The Museum is an interesting and instructive one, and we hope that it will be largely attended by the public of the South-Eastern district of London.

THAMES BRIDGES.—The Highways Committee of the Middlesex County Council have been instructed to enter into fresh negotiations with the Surrey County Council with the view of reopening upon the extreme narrowness of the roadway and of the pavement, which is alleged to be a source of great danger to the public. It is understood that the London County Council will also be appealed to, it being contended that the cost to be incurred in widening, or otherwise improving, the bridge, is likely to be a very large one, and that after all the present inconvenience and danger is in a great measure due to the enormous traffic coming from the City of London. A proposal to widen Kingston Bridge is also under discussion. —*Morning Post.*

COMPETITIONS.

THE GAMBLE INSTITUTE, ST. HELENS.—At the meeting of the Gamble Institute Committee, held at St. Helens on the 20th inst., it was decided to engage Messrs. Briggs & Wolstenholme, of Blackburn, to whom the assessor for the premiums awarded the second prize for the designs of the new Technical Schools and Free Library, as the architects to carry out the execution of the new buildings.

NEW BUILDINGS IN THE OLD SQUARE, BIRMINGHAM.—As the premises of Richard Lunt & Co., Limited, in Moor-street, Birmingham, will be required by the London and North-Western Railway Company, in connexion with the projected new tunnel into New-street Station, and the business in consequence having to be removed, the directors have taken on lease the site of the Winter Gardens in the Old-square, containing an area of 2,267 square yards. As the new building is to be of considerable magnitude, and to occupy an important position, the directors invited architects to send in plans in competition, and they received fifteen sets, from which they selected, with the assistance of Messrs. Harris & Harris, architects, three sets. The directors then called in Mr. Thomas Naden, architect, to make the final selection, and his decision was given in favour of set No. 5, which, on the envelopes being opened contained the names of the competing architects, was found to be that of Messrs. Essex, Nicol, and Goodman, and they have, accordingly, been instructed to proceed with the work forthwith. The new block of buildings will have a frontage of 119 ft. to the Old-square, and a depth of 171 ft.

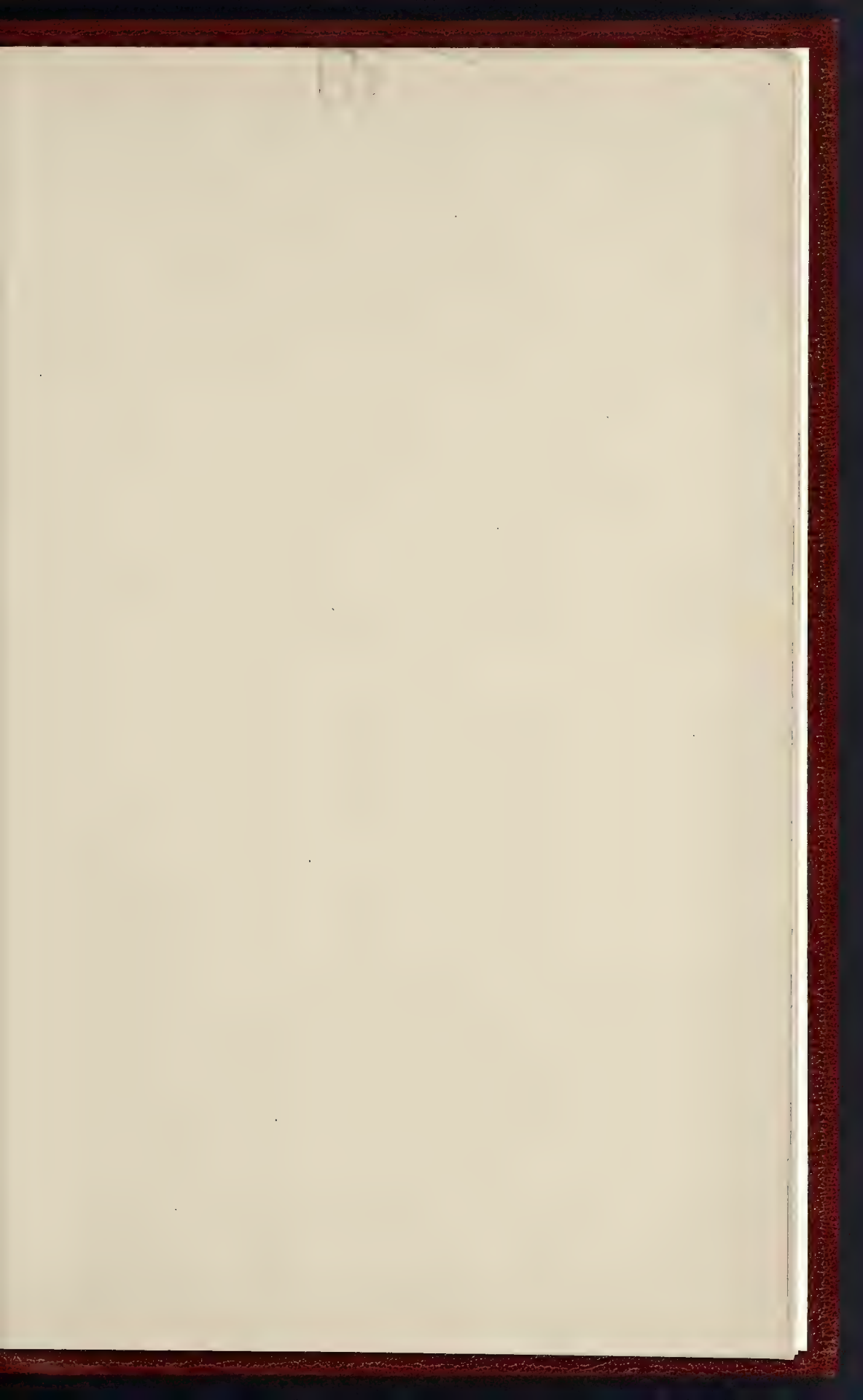
ARCHITECTURAL SOCIETIES.

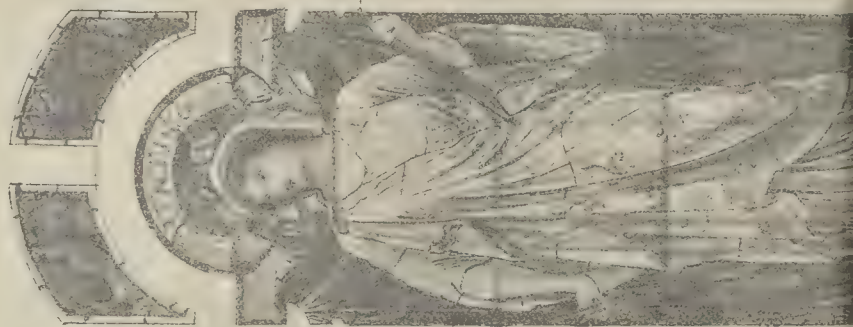
LIVERPOOL ARCHITECTURAL SOCIETY.—The Liverpool Architectural Society are continuing the classes for students during the present Session as in the past. The various lectures are framed on the lines set forth by the Royal Institute of British Architects, and are intended as a preparation for the Institute Examinations, the subjects and lecturers being:—"History of Architecture," Mr. T. Taliesin Rees, A.R.I.B.A.; "Mouldings, Features, and Ornament," Mr. C. E. Deacon, F.R.I.B.A.; "Building Construction," Mr. J. W. Blakey, A.R.I.B.A.; "Sanitation," Mr. T. Harnett Harrison, F.R.I.B.A.; "Quantities and Specifications," Mr. H. L. Beckwith, F.S.I.; and "Theoretical Mechanics and Strains," Mr. R. J. Angel, A.R.I.B.A. Mr. C. W. Harris has been awarded a prize for the best work done during the last Session.

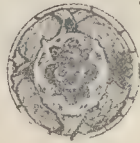
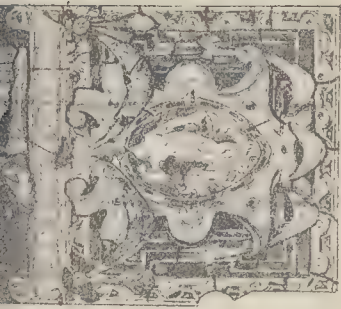
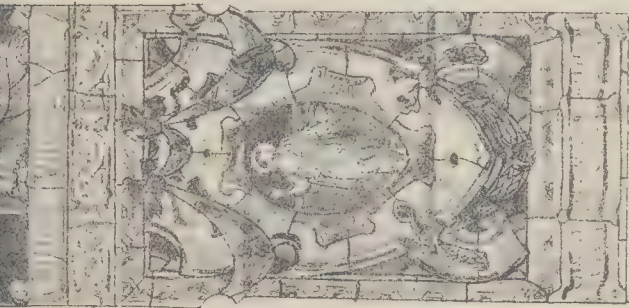
LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—On the 18th inst., at a meeting of the Leeds and Yorkshire Architectural Society, Albion-place, Leeds, Mr. F. W. Troup, of London, delivered a lecture on "The Use of Seconds." Mr. G. B. Bulmer presided. In the course of his remarks the lecturer observed that there was a class of bricks principally manufactured in Leeds—glazed bricks. When made white they were prized for their reflective value, and when coloured were used decoratively. A wall of pure white bricks looked deathly cold. If some of the seconds, or discoloured bricks, were used, the effect would be warmer and more pleasant. Leeds was smoky, and he could not think why architects did not use glazed bricks more freely than was evident from the Leeds buildings. He had seen some in large insurance buildings, and there was a vast array of white bricks in the new Leeds Post Office. Those, however, were put in by outside architects. Could it be that bricks, like prophets, were not valued in their own country? In moving a vote of thanks to the lecturer, Mr. Dodgshun said with regard to glazed bricks that the seconds would not wear. It was absolutely necessary to have a perfect glaze.

CARLISLE ARCHITECTURAL, ENGINEERING, AND SURVEYING ASSOCIATION.—A meeting of this Association was held on the 20th inst. in the Town Hall, Mr. Higginson presiding. Mr. Lees, Head Master of Carlisle School of Art, gave a lecture on "Ornament," both historical and artistic. With the aid of diagrams he traced the rise and development of ornament among the Egyptians and Greeks, and explained the symbolic nature of Egyptian ornament. The lecture was illustrated by paintings and drawings.

NEW BOARD SCHOOL AT KEIGHLEY.—The Holyroft new infant school, Keighley, was opened recently. The new structure, planned by Messrs. W. & J. B. Bailey, provides places for about 480 infants, at a cost of 4,000.





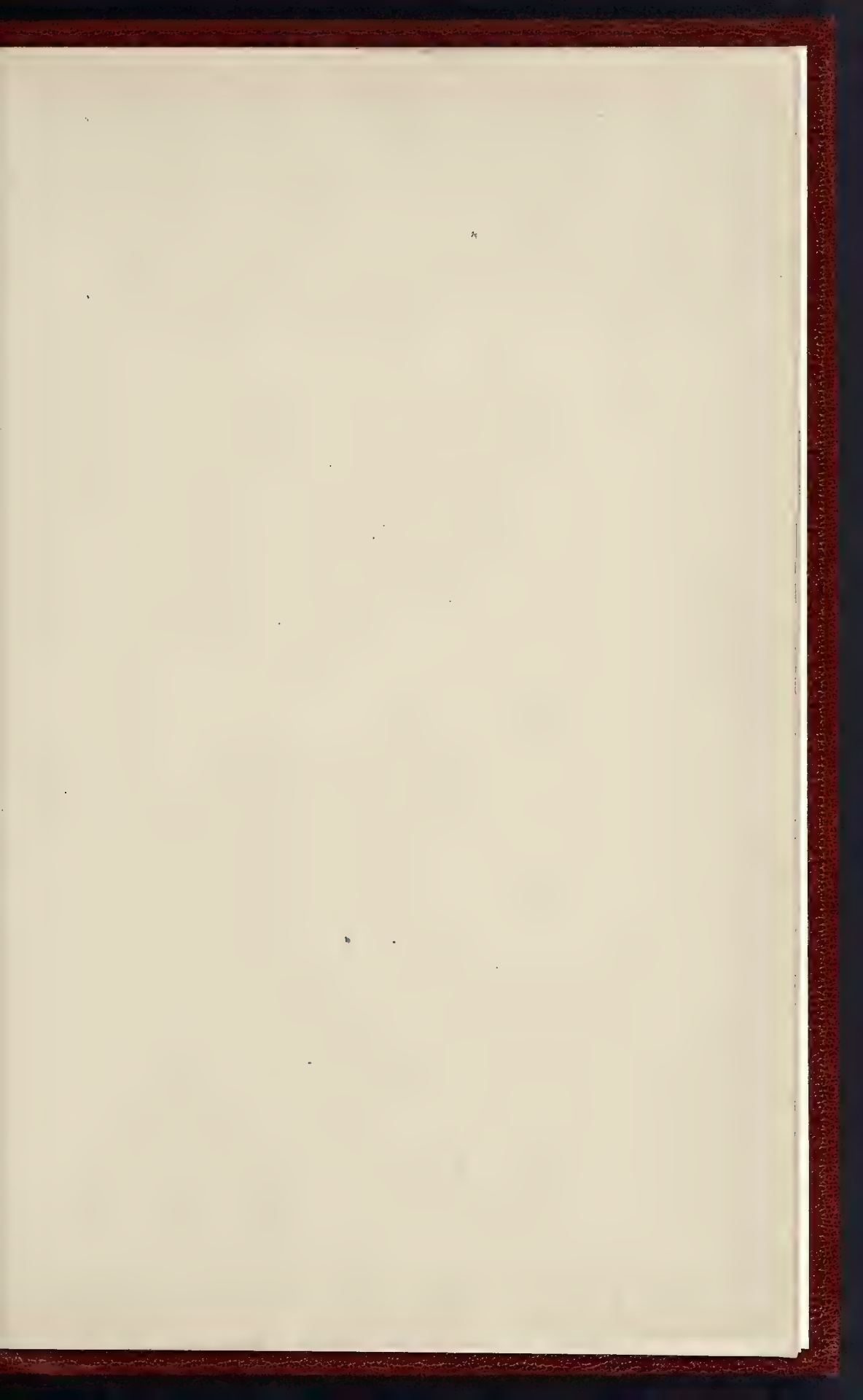


STAIRCASE WINDOW FOR R PILKINGTON ESQ^{RE}
"RIVINGTON" N^R MANCHESTER

DESIGNED AND EXECUTED BY

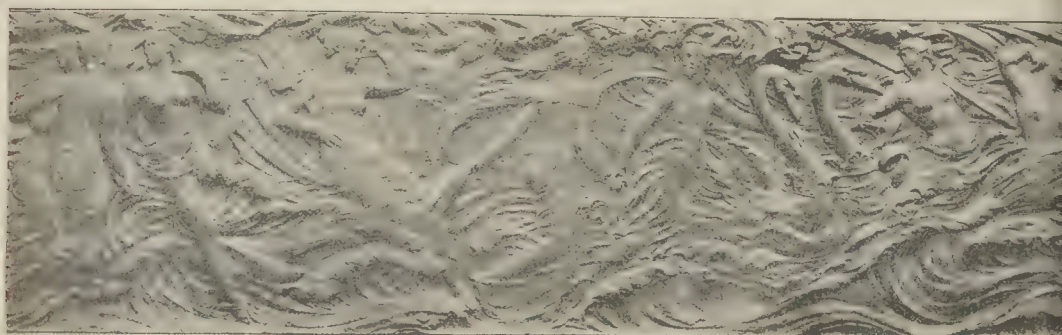
MESS^{RS} HEATON BUTLER AND BAYNE
UNDER THE SUPERVISION OF MEDLAND TAYLOR ESQ^{RE} ARCHT^T
MANCHESTER







FRIEZE OF SMOKING-CABIN: SILVER LACQUERED



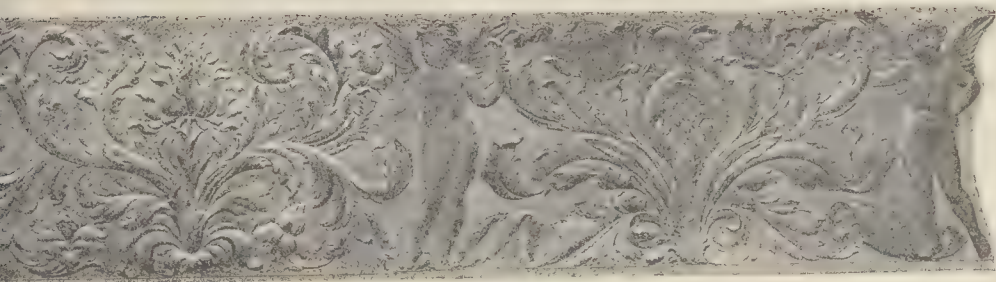
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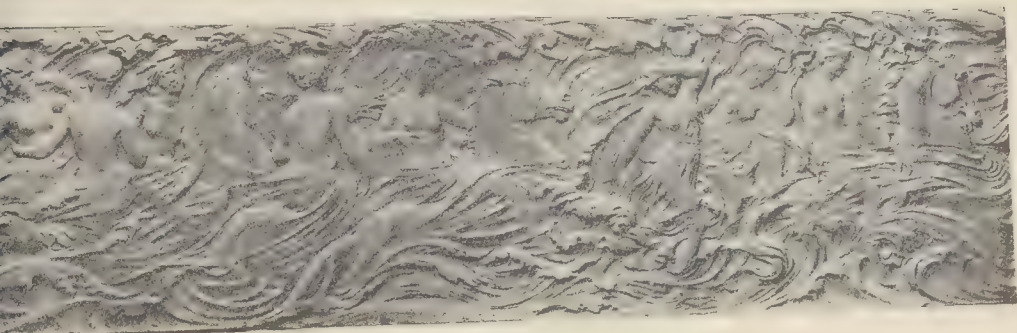
MARQUETRY PANELS
OF BOOKCASE.



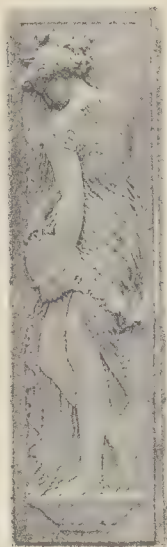
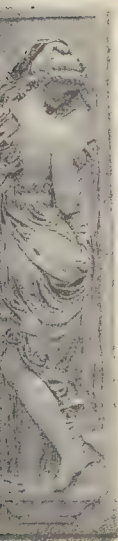
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SHADES; GROUND PAINTED A DARKER GOLD.



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LIBRARY.

MARQUETRY PANELS
OF BOOKCASE.

ENGINEERING SOCIETIES.

THE JUNIOR ENGINEERING SOCIETY.—At the last meeting of this Society, held at the Westminster Palace Hotel, Mr. Percy Waldram in the chair, a paper was read by Mr. S. Cutler, junr., on "Coal Gas Manufacture and Recent Improvements of the Plant employed therein." Commencing by showing how rapidly the demand for gas had increased since its introduction, the author proceeded to briefly describe the usual processes of gas manufacture, passing on to a detailed account of the recent improvements which had been adopted; the inclined system of retorts to obtain automatic charging and drawing, the latest forms of condensers and airifiers, compressed air, hydraulic and rope power machinery for working horizontal retorts, water-seal valves, water gas plant, and other features being dealt with. Of gasholders, that at Kensal Green of 8,000,000 cubic ft. capacity, and another of 300 ft. diameter, semi-circular, at East Greenwich were described. In conclusion, the cost of manufacture, by-products, the future of gas considered in respect to electricity, and gas employed as a heating agent were touched upon. A discussion followed the reading of the paper, Messrs. H. Fraser, H. Cook, S. Cutler, senr., W. Tennant, S. Boulding, and others taking part.

LIVERPOOL ENGINEERING SOCIETY.—The fifth annual meeting of this society was held at the Royal Institution on the 20th inst., Mr. H. Percy Boulton, M.Inst.C.E., President, in the chair, when a paper entitled "A Tour in South Africa, with reference to Engineering Work, Past and Present," was read by Mr. G. L. Burton, Assoc. M.Inst.C.E. After a brief outline of the history and a short reference to the towns, harbours, and rivers, the author devoted his remarks to the railways, the diamond-fields, and the gold-fields. The first Act for railways was passed in 1857, although the first line was not actually opened until 1863. From then, until about 1875, little progress was made in the way of railways, mainly, perhaps, because up to this point they had been built by private contract. About this period, however, the Government bought all existing lines and continued all extensions. The original gauge of the lines, as built by private enterprise, was 4 ft. 8½ in. After the purchase, however, by the Government, this was altered, and all further extensions made to ft. 6 in.—a fact which is now much regretted by all leading men in the colony. In Natal the railways have been pushed forward with greater difficulty, owing to the fact of its being a Crown colony, and, therefore, not master of its own destinies.

Books.

The Dynamo: its Theory, Design, and Manufacture. By C. THOMAS, M.A., A.I.E.E., and F. WALLIS, A.I.E.E. London and New York: Whittaker & Co., 1893.

IT is almost inevitable that a text-book dealing with any rapidly advancing branch of knowledge should be, in however small a degree, out of date almost as soon as it is published. With such a subject as the dynamo, this danger is exceptionally great. Not only is its development rapid, but the subject is so large, that any adequate treatise on it must needs take a considerable time to write.

Moreover, it rarely happens that the authors of such text-books are themselves actually engaged in the development of the machine of which they treat; they are almost invariably professors rather than engineers, men who know the dynamo very intimately in the laboratory, but very distantly in drawing office and workshop. The contrast between the elaborate formulae and complex mathematics of the professor and the simple methods of calculation developed by the engineer too well known to need even a passing mention. "I had no idea a dynamo was so complicated; it is enough to make one give up trying them," we heard a witty manufacturer as he glanced over the pages of a technical treatise on the subject—not, we must add, the one before us, of which, indeed, he spoke very fully.

We lay no claim to originality," say the authors in their preface, "save on certain points, such as the 'construction of dynamos, or the E.M.F. of alternators,' yet we claim a certain novelty in our method of treatment by which these facts are presented." The

passage is a fair, if compressed criticism of the book. It is this novelty of treatment, which differentiates the present volume from others of the kind, and makes it impossible to gauge its value merely by comparison with some standard work.

The authors, unlike the self-styled practical man, evidently possess a sound knowledge of the science of electricity, or, at least, of such a part of it as they deal with; unlike the mere laboratory teacher, on the other hand, they know the dynamo as manufacturers know it.

The introductory chapter gives us a favourable impression at the outset; there is none of the too-common confusion between "force," "power," and "energy," and the authors, mindful of what the reader has probably been taught elsewhere, devote some space to explaining to him what these things are *not*. The "magnetic field" is next considered, and lines of force are ingeniously traced by a long thin magnet with one end thrust through a cork, so that it floats vertically with the upper pole just level with a bar magnet whose horizontal field is being investigated. By some strange oversight, the authors, seemingly forgetting that they are using one pole only of the floating magnet, say, "our exploring boat would start moving from any place near the magnet (except just at its centre, where there is no magnetic force)." The italics are ours. If this were so, the lines of force would be discontinuous at the centre of the magnet. This strange error might easily puzzle a thoughtful beginner, and should certainly be corrected in the next edition.

Little need be said about the next few chapters. Their subject-matter may be found in any sound text-book on electricity and magnetism, though not, perhaps, so fully illustrated. The formula $E = 10^{-8}$, is merely stated, though it might easily be proved, while over elaboration rather obscures than elucidates the simple and sufficient knowledge that the E.M.F. set up in a moving conductor is dependent only on the rate of cutting lines of force.

Self-induction is the *pons asinorum* of many an electrical engineer. The chapter that treats of it is well worth perusal.

At a meeting of the Institution of Electrical Engineers, Mr. Harrison was unorthodox enough to criticise Dr. Hopkinson's way of graphically showing the effects of self-induction. He stated that the only rational thing to do was to regard self-induction as E.M.F., and to draw the curves accordingly. From the start the authors keep this view before the readers. In a circuit they consider: "(1) The impressed E.M.F.; (2) the E.M.F. of self-induction; (3) the resultant E.M.F., which immediately causes the flow of current, and the value of which at any moment is the algebraic sum of the values of the other two." Certain circuits are considered and the results obtained, clearly explained by means of curves.

A little further on comes a chapter which might well be placed earlier in the book, viz., that on the "Magnetisation of Iron." It admirably summarises the broad results of the researches of Hopkinson, Ewing, and others.

It is no easy matter to classify dynamos satisfactorily, and the authors have hardly solved the problem. The Uni-polar dynamo, in the original sense of the words, exists now only as a historical curiosity. The authors first give a new meaning to the expression—a thing always to be avoided if possible—as to include some few real machines (though most of those elaborately described exist only on paper), and then promote their fond invention to the dignity of first place as "Class 1." There is a whole chapter, too, devoted to uni-polar alternators, some of which, as the Mordey alternator, have more than a dozen poles. We regret that the authors should give their countenance to the unhappy suggestion made some time ago to restrict the term "dynamo" to direct current machines. The use of iron core in armatures and the reasons for laminating it are very elementary matters, but they are well and clearly put for the benefit of beginners. Armatures are next dealt with, and their classification is much more satisfactory than that of dynamos. Especially good is the account, or rather the evolution, of open coil armatures.

After a practical chapter on the construction of armatures come two chapters on "field-magnets," in the first of these, such matters as the form of the magnets, so as to waste as little energy and copper as possible in maintaining the induction, the question of under-type or over-type machines, throttling, &c., &c., are considered; in the latter, calculations for the ampere turns of the field. Next we have a chapter on series, shunt, and compound winding, which is not overburdened

with calculations, stress being rather laid upon the principles which should guide the designer. The student here is first made acquainted with characteristic curves, which are to the dynamo what indicator diagrams are to the steam-engine.

Lifting the brushes of a shunt machine on open circuit is an experiment dangerous alike to the machine and the experimenter, nor is it to be advised even on closed circuit, "if the machine would happen. Our authors say, 'if the machine was running on a closed circuit, say, of incandescent lamps, the person would be less liable to receive so severe a shock, since the so-called 'extra current' is discharged through the external circuit, and causes the lamps to momentarily flash up.' This is quite true if there are so few lamps that the current in the fields is greater than that in the external circuits; otherwise the lamps would not flash up. Of course, the momentary current in the lamp circuit due to the self-induction of the fields is in the opposite direction to that before the brushes were lifted.

It is needless to say much on the chapter on "Sparking and the angle of lead," the treatment is quite orthodox, but there is little opportunity here for originality, even in manner of presentation. "The heating of dynamos" is very well handled; we find additional evidence of the superiority of America over Europe in matters electrical, of which we have heard so much lately, in the sentence, "In the United States dynamos are frequently worked at considerably higher temperature than would be tolerated in England." The "description of typical dynamos" is the only chapter that at all suggests "paste and scissors." Dynamo-designing can hardly be taught on paper, but the concluding chapter on "working and management of dynamos" contains many excellent and practical hints.

In conclusion, the student into whose hands this book falls must remember that he will not, in practice, be called upon to classify dynamos, but to understand and readily grasp details, to carry out tests, and to show intelligence and promptitude in cases of emergency. He must recognise that he has but half learned to read unless he has learned to skip, and he should not waste his time reading several pages to show that two halves of armature must balance. It is sufficient for him to get hold of the principles on which the mathematical calculations here given are founded, not to follow out all the calculations exactly, that is, if he is training to become an engineer. If he only wants to pass an examination, his course will be very different, but then he had better consult some other book.

A Manual on Lime and Cement, their Treatment and Use in Construction. By A. H. HEATH. London: E. & F. N. Spon. New York: Spon & Chamberlain.

THIS manual, compiled from many sources, is in many respects a good one, not merely for the students at the Royal Indian Engineering College at Cooper's Hill, but for builders in general. We fail to detect any omission of primary importance, though doubtless the desire to produce a low-priced work has had much to do with the entire absence of illustrations. It is, however, impossible for a student to follow descriptions of kilns and their parts, of mixing and testing machines and other apparatus without explanatory diagrams, and it would also have been well to have included in a manual sets of reliable tables of results obtained in the testing of the two materials treated of, both singly and in combination with other substances. Of course a good deal is said in the text about this, but condensed information is often of the greatest practical value to men of business, who as a rule want references handy and simple, and are not concerned to work out calculations if they can get this branch of work sufficiently well done by others. In such respects a manual need not necessarily clash with a handbook or with a price book.

Starting with some definitions, the author then proceeds to slightly notice the localities and natures of some of the limebearing rocks (including chalk) which are known in Great Britain, and then launches into the manufacture of Portland cement, which is very thoroughly treated—more so, in fact, than that of the "manufacture of lime. Equally thorough is the chapter on the various tests to which Portland cement should be subjected, but the differences in the stresses per square inch at various dates (see page 84) for neat cement briquettes and cement-mortar briquettes respectively are not sufficiently explained, nor is the composition of the mortar given. We note, and cordially agree with a conclusion at which

the author has arrived, viz., the fallacious nature of the weight test for Portland cement, for it would be far better to omit from specifications any mention of weight per bushel. Especially interesting is the section devoted to the hot water-bath, as the best means of overcoming the objection to the use of mortar briquettes for testing cement for tensile strength; the length of time, usually twenty-eight days, which has to elapse before the test can be applied, being most inconvenient. Hot water in place of cold water immersion reduces the twenty-eight days to six. It should, however, have been noted that it would frequently be very difficult to arrange for the maintenance of a uniform temperature in the bath for several days of 176 Fahr. It is unquestionable that the actual strength of mortar for use in building is far more satisfactorily ascertained by testing mortar briquettes than by testing heat cement briquettes.

The author tells us how to restore the vitality of damaged cement, which may be useful and necessary for remote districts, but his advice that it should not be kept more than three months without being used is probably discreet. In testing for fineness of grinding, it would be well, as the author suggests, to pay a little more attention than is usually the case to the fineness or gauge of the wires in the sieve, and not rest contented with merely specifying the number of meshes per square inch. There is a great variation in this respect, and the German rule of the diameter of the wire being one-half the side of the mesh opening would be a good one for general adoption. Not the least valuable part of this section of the work is the description of such tests as can be applied without the use of the tensile testing machine and moulded briquettes, tests of a description which are, indeed, sometimes, but by no means always, known by those who are prone to style themselves "practical men." The modes of making mortar and concrete are duly and carefully described, but present no especial features for criticism. This manual forms, on the whole, a very commendable addition to the collection of technical works required by those who are concerned to build with economy and with skill.

Théâtre Flamand à Bruxelles, par JEAN BAES, Sous-Directeur de l'École des Arts Décoratifs. Brussels: E. Lyon-Claesen.

THE number of publications describing individual modern opera-houses or theatres of importance is small; the cost of bringing out books of this kind is so high that the price has to be a prohibitive one for the majority of architects, and their market is thus limited to libraries and public institutions. Since M. Garnier's excellent plates and letterpress describing the Paris Opera House, the only similar publication of note has been Herr Auer's illustrating Messrs. Van der Nüll and Von Siccardburg's new Vienna Opera House; while the new "Flemish Theatre" at Brussels, designed by M. Jean Baes, published at M. Lyon-Claesen's atelier, is perhaps the first small theatre which has been thus illustrated. In some sixteen excellent plates M. Baes has reproduced the architect's drawings, which were recently to be seen on the walls of the triennial Belgian Salon, together with some photographs of the building, and this combination makes the volume even more valuable than the reproduction of drawings only, as has been the case in Paris and Vienna. The reproductions of both drawings and photographs are exceedingly clear, and the scales to which they have been prepared allow the student to become thoroughly master of the work shown, without the usual strain on his eyes. In some ten folio pages the publisher describes the history of the building, and the principles upon which the architect planned it. As a supplement he adds a chromo-lithograph of the proscenium curtain, which was specially designed by the architect.

The theatre described has been erected on a site open on all four sides, measuring 56 mètres by 25 mètres, or some 180 ft. by 80 ft. The auditorium has four tiers, but the stage is only a comparatively small one. The erection of the theatre, which had a difficult foundation, took three years. Herr Baes' conception of the plan dates from 1883, i.e., after the King Theatre fire, but previous to the Paris Opera Comique catastrophe. The theatre regulations at Brussels were not stringent at the time—in fact, their present purport is due mainly to the example set by M. Baes in the careful planning of his theatre.

As regards the plan of the theatre there is little to say, excepting that the architect was much hampered by the narrowness of the site, which prevented his finding ample staircase

accommodation, and caused him to design an elaborate system of exterior balconies to lessen the risk of loss of life by panic or fire. This system of balconies, which gives the whole structure its individuality, is certainly one of the best makeshifts, but unfortunately it will always have to be classed as such—i.e., a makeshift—and rank lower than any good scheme of interior staircases. Emergency exits of any kind, even if they lead direct on to a balcony, can never be so strongly recommended as the perfect arrangement of the ordinary routes of egress. If perfect in themselves they may form a valuable auxiliary in case of emergency, but they should be counted as auxiliaries only, and not as necessities, as in this case, where the staircases alone cannot be termed model ones.

The Colliery Manager's Handbook. By CALER PAMELY. London: Crosby Lockwood & Son.

IT is probable that the underground worker, who has been so much in evidence of late, has little conception of the immense amount of laborious study necessary, or of the wide range of subjects which must be taken in hand, before the student can hope to master the science of mining. The career of the late Sir George Elliott affords a striking proof of the value of combining science and theory with the practical work of the mine; but the average miner makes use of the appliances, and trusts himself to the machinery devised by the engineer and the man of science, with but a dim idea of what has been involved in the attainment of their knowledge. Certainly the general public would be surprised to find a work modestly described as a handbook, comprising considerably over 600 pages, and dealing with some half a score distinct branches of science, devoted to an industry of this nature.

The student of coal-mining may certainly consider himself fortunate in having access to a work of so comprehensive a character as this. Everything bearing upon the subject, both in theory and practice, appears to be exhaustively treated, the reader being conducted, above ground and under ground over the various coal-fields of this and other countries, with an occasional excursion to gold mines and oil-fields. The consideration of explosives and blasting operations introduces us to many particulars concerning the nature of the nitro-compounds which are just now associated in many minds more with anarchy than with coal-mining. The illustrations are very numerous and well executed, though it may be remarked that, besides assisting the reader, they appear calculated to form excellent advertisements for some of the firms whose machinery and appliances receive prominence. We notice a large number of elaborate and carefully-expressed calculations, and "questions and answers" in various branches of the subjects treated form a prominent feature. Much of the information given in the engineering sections might prove almost equally valuable to young men preparing for occupations other than mining; while interspersed among the technicalities with which the work necessarily abounds, may be found information regarding life underground which is not without interest to the general reader.

Factory Accounts, their Principles and Practice. By E. GARCKE and J. M. FELS. London: Crosby Lockwood & Son.

INDUSTRIAL legislation proceeds at such a pace in these days that it must be somewhat difficult for proprietors and overseers of factories to keep up with it; and it appears likely to become increasingly embarrassing to all employers of labour. The authors of "Factory Accounts," in their preface to the fourth edition of this useful work, remark that it has been brought as closely as possible up to date, and we observe that there is much new information in a condensed form regarding the later Factory and Workshop Acts. Should a further edition be called for, "Employers' Liability" will probably claim a place—unless, indeed, it should be deemed to open up too wide a field. The present Bill has been described as one which will provide plenty of work for the lawyers, and it will certainly exert some influence upon the accounts of many factories and various industries hitherto making their own arrangements in regard to this matter; probably raising some complicated questions in the case of industrial partnerships and other co-operative concerns. The general scope of the work was commented upon in the *Builder* on the publication of a previous edition,* and its reappearance in its present enlarged form affords evidence of popularity and usefulness.

* Page 308 (January to June, 1890).

Cottage Sanitation. By HECTOR MACLEAN WILSON. With a preface by T. PRIDGIN TEALE, F.R.S. Published by the Royal Agricultural Society of England. London: 1893.

THIS is a paper embodying the views of a few gentlemen, medical officers of health and others, who met at the house of Mr. Pridgin Teale in October of last year to consider the drawing up of some simple suggestions as to the sanitary requirements of country villages. The book is little more than a pamphlet in size, of twenty-four pages, and has evidently been purposely got up in a cheap form to bring it within everyone's reach. It is, however, an admirable summary of the subject, illustrated by diagrams where necessary, and if it were largely read and acted upon the reports to the Local Government Board in regard to the condition of rural sanitary districts would be less melancholy reading than they generally are. Dr. Poore, who writes on the subject of dry closets on another page of this issue, would perhaps suggest some improvements in the construction of privies as indicated here; but in the main the suggestions are such as all sanitarians will be agreed about. The sections illustrating the manner in which wells may be fouled are most significant, if one can get those most concerned to understand them—that is the difficulty.

Méthode Pratique du Dessin, à l'Usage des Apprentis et des Artistes du Génie Civil. Par L. RAPPILLY & L. VILLETTE. Paris: Pierson et Cie. 1893.

THIS is one of the numerous small books which have been written with the object of making plain to a beginner the problems of perspective and foreshortening, and is one of the best we have seen. The instructions are brief, clear, and practical, and the illustrations admirable. The object of the whole book (an octavo of 48 pages) is to give a kind of general outline of the meaning of the art of drawing, and what it endeavours to accomplish; and this is so clearly done that a clever student might make a great deal of progress for himself merely on the basis of what he will learn from this small book. It might be worth translating into English.

TRADE CATALOGUES.

THE Threlkeld Granite Company send us a handsomely got up circular in book form, in regard to the Threlkeld stone, which is called a granite incorrectly as they admit, but which has some of the qualities which characterise granite as an enduring road material. The testimonials of various engineers and others as to its behaviour as a road material seem very satisfactory.—Messrs. B. S. Brownlie & Co. send us their illustrated catalogue of sanitary ware in white and yellow enamelled fireclay.—Messrs. J. H. Wilson & Co. have issued a well-illustrated and fully-priced catalogue of their lifting machinery, dredgers, winding engines, &c.—From Mr. J. H. Sankey we have received a small-sized catalogue of varied descriptions of brick, stoneware, and tiles, including blue and buff stoneware, chemical stoneware apparatus, channels, traps, junctions, chimney-pots, and ornamental tiles.

Correspondence.

To the Editor of THE BUILDER.

THE ORIENTATION OF TEMPLES.

SIR,—Your correspondent "Enquirer" in your issue of the 16th inst., has put some questions which may very naturally occur in the first opening of the above subject, but which can, as it appears to me, be very conclusively answered. As respects question 1—"Was the star needed at all?" You, Sir, have, I think, in your leading article of the previous week, given a sufficient answer to this question in showing the high probability that the Greeks in their temples of earliest foundation were but following in the steps of the Egyptians, in whose country the adytum of the temple must have been the point of observation where the light from a rising or setting star would be received "through the long avenues and vistas leading from light to gloom," much in the same way as Mr. Lockyer has pointed out that a ray of light is guided through the diaphragms of a modern telescope. In the Greek temples also, following Egyptian types, the adytum would have been the place of observation, and from this point stars rising or setting in the general direction of the axis of the temple could alone have been seen. We know from other sources (though it hardly needs argu-

ment) that before the invention of clocks the time at night was measured by the rising or setting of the heavenly bodies.

2. The condition which has been named, that archaeological probability has to be observed in this study, is criticised by "Enquirer" as "arguing in a circle." Granted that it is so; but it is a circle of very unusual extent, being measured by 26,000 years, whilst all the examples are confined to a segment of less than 1,500. An Orientation in Greek architecture which should require a star coincidence outside the smaller limit would have to be looked at with great suspicion; but there are no cases known to me.

For solar temples, too, the choice is very much restricted. I do not find that there are more than eighteen stars or star-groups which could have been used in the entire zone of the heavens; even if the time limit introduced by archaeological probability were dispensed with. One of the eighteen cases is that of ♄ Aqauri to which, with one or two others, "Enquirer" objects on account of its want of brilliancy. This objection may be allowed to hold of this particular star, but the star does not stand alone: it is the representative and centre of a conspicuous and compact constellation. Besides, in this and every case of the stars of magnitudes below the first (not reckoning the Pleiades which are obviously exceptional) these stars are found to have been combined with the orientation in such a manner that a rather larger interval of time was allowed between the star waning and the sunrise than when stars of the first magnitude were employed.

3. The cellas of the temples have been in so many cases destroyed that the evidences of Western doorways have in most cases been obliterated. They existed, however, in the Parthenon, in the Temple of Jupiter Panhellenius at Aegina and at Corinth, and in no case where I have found that a setting star agrees with the orientation is there evidence of an unpierced Western wall, excepting the Temple of Niké-Apteros at Athens; but the existing temple was rebuilt after the Persian invasion, long after the star had ceased to answer its original purpose. The peculiarity of the site of Bassæ appears to have determined its north and south position; it certainly did so at Mycenæ and the Gabeiron, near Thebes.

5. Previous to the study of solar and stellar orientation it was certainly a very reasonable theory to advance that picturesque of general effect led to so many groups of buildings in Greece being placed obliquely to one another; but whilst granting the happy result, we can hardly suppose that this consideration could have actuated the builders of the very modest shrines which were first founded and which determined the lines of the more sumptuous structures which were subsequently raised on the same sites, and in most instances having the same parallels.

F. C. PENROSE.

THE SANITARY INSTITUTE REPORT ON FLUSHING CISTERNS.

SIR,—As the correspondence in the *Builder* and elsewhere shows that considerable interest is taken in the experiments which the Sanitary Institute has recently carried out on the flushing of closets and drains, perhaps you will allow me to point out for the information of your readers that the work was undertaken by the Institute as a question of public interest, and in order to make the information as widely available as possible the report, with the tables and plans, has been published as an excerpt from the *Transactions*, and can be obtained separately.

G. WHITE-WALLIS, Secretary.

THE CAUSES OF BAD WORK.

SIR,—With reference to Mr. H. R. Taylor's letter in your last issue, I should imagine from his remarks that he is a supporter of trades-unionism and not an employer of labour, or at any rate he would know that what he states in his second paragraph is contra to practical experience at all events. A good man on any work at full wages is known always to be the best man, and the cheapest, whether it be upon plain or intricate work, and a good man is always worth his money, and an inferior one—like everything which is cheap—is bad in any respect, and in my experience it is the worst men, whether paid at a higher or lower rate, that are discharged first, when occasion requires shortening of hands, and a good man can always obtain employment anywhere at full wages.

As regards the quality of London work, I should like to show Mr. Taylor a letter which I have received only recently respecting some work which has been done in London by unionists, and if he did not alter his opinion I am afraid his mind is hardly open to conversion. I am also in possession of facts

from which it is certain that, on a job now completing in London, where country-produced work and London-made work (in about equal proportions) has been used from the very beginning until the present moment, during a period extending over several years, the former is very much indeed superior to the work done in London. Moreover, we people in the country generally find that London men who come into the country to work are inferior to country workmen, as regards their ability to do the best work, and I have only during this year had a man from London, who had there been in receipt of full unionist wages, come to me, and when he found the character of the work which was done in my establishment, asked to be permitted, at much lower wages than he has been receiving in London, and at a wage below the standard of the men employed by me, to work with me as improver, as he stated he had not had an opportunity in London of learning his trade, and seeing such good work as was done with me!

These are facts of my knowledge, and they are difficult to reconcile with the statements published in Mr. Taylor's letter.

A PROVINCIAL EMPLOYER OF UNIONIST LABOUR.

BATH PUMP-ROOM COMPETITION.

SIR,—While I cannot concede one iota of my original view, I can and do say that if a competition be invited on the clear understanding at the outset that the dictum of the "adviser" is not binding on either side, there can of course be no injury whatever done, each side knowing its exact position; but I still maintain that the "award" of an arbitrator (for such the "assessor" surely is, or should be), cannot be set aside without injustice and injury to the competing architects, nor indeed to the committee inviting them (unless the arbitrator's opinion is on a par with that of the umpire in a cricket match who said, when appealed to for a decision, "If you'll believe me, gentlemen, I wasn't looking, but if he does it again he'll be out"), but architects are, methinks, usually selected from the ranks of men of evident ability and honour, and therefore their judgment as experts should surely be of more value than those of the general public (from whose ranks committees come), whose opinion seems bounded by the dictum "I know what I like." In a word, if he is merely an "adviser" he cannot be called an "assessor."

For some years I have kept clear of competitions, and only move now in the honest belief that what I advance is the only way to secure fair play on both sides, unless it is conceded without a struggle that our professional brethren are so unimportant that they must perforce accept, and that without question, any judgment meted out to them.

E. SWINFEN HARRIS, F.R.I.B.A.

* * We think our correspondent is mistaken in regard to the meaning of the word "assessor." We take it that an assessor is a person who sits by and advises as an expert.* If the architectural profession choose to agree not to go into any competitions unless the assessor makes the award absolutely and chooses the architect who is to carry out the building, they may get that, but on the other hand they may pull the cord too tight, and end in squeezing out the assessor altogether. And our correspondent, like some other persons, does not seem to see that there may be disadvantages in giving absolute power to the assessor. He may be a very eminent architect, but he is an individual, and has possibly strong predilections in favour of one style or one method of planning, and the result will be that he will choose the design which most accords with his own tastes, and that the man will win who knows his tastes and consults them. The case is very similar to that of judge and jury. The judge in a court of law is nearly always a much able man, and knowing much more about law, than any one on the jury; but he is a single person and liable to the prejudices of a single person, and the jury are provided to obviate that danger. He advises and instructs the jury, and they find the verdict, and it is probable that the interests of justice are safer on that system than if the judge gave the verdict. Why should not the same reasoning apply to the case of assessor and committee?—E.D.

KIRKCALDY HALLS COMPETITION.

SIR,—One would expect that in such competitions as this, instituted by an honourable corporation, the conditions would be honourable and fair to both the corporation and the profession, and that the competition would be carried on in accordance with the suggestions of the Royal Institute of British Architects. Evidently no competent party has been advising the corporation as to the conditions, for a letter with five conditions comes as a supplement to the first document, containing, like a lady's post-

* Since the above was written, we have referred to Webster's Dictionary, and find "assessor" defined generally as "one who sits beside; the assistant of a judge." It is more particularly defined as "one appointed or elected to assist a judge or magistrate with his specific knowledge of the subject to be decided as *legal assessor*, *magistrate*, &c." This, it will be seen, entirely disposes of the idea that many architects seem to have, that the term "assessor" in itself implies the power of absolute decision; it rather implies the contrary. The "assessor" is in ordinary acceptance an adviser, not a judge.—E.D.

cript, the most important matters. As a footnote to the supplement to the conditions the important implication is given that the plans are to be on imperial drawing paper. Now, either the Kirkcaldy arithmetic is defective, or it is not known in that locality that the size of imperial is 30 in. by 22 in. The length of the site is 300 ft., and the scale is fixed at one-eighth of an inch to the foot, thus the paper is 7½ in. too small to hold the ground plans even without a margin. It looks as if the Kirkcaldy folks had earned their ideas of economy a little too far this time. They want altogether too good a bargain. As, for instance, they appropriate the plans awarded the second and third premiums in order that they may adopt the good points without payment, thus not only stealing the author's ideas, but depriving them of their well-finished drawings. In asking specifications, they also exact more than they are fairly entitled to, but in reducing the architect's fee by 20 per cent. they have beaten the record. Jews are supposed not to be able to make a living in Aberdeen, but I think the Kirkcaldy folks could give even Aberdeen points. It is to be hoped that the corporation will recast their conditions in accordance with the Institutes' suggestions.

FAIR PLAY.

PRIME COST.

SIR.—A great difficulty by which architects are often beset is that of dealing with "Prime Cost" provisional sums. It is usual to define "prime cost" items somewhat as follows:—"All items marked as 'P. C.' mean prime cost value at works, and it is to be distinctly understood that any profit the contractor may desire, charge for packing, carriage, and fixing, are to be added to the amount named in each case."

If the amount specified is fully spent, then the contractor tries to force a further allowance from the manufacturer. Or if it is in the provinces, the architect goes to the ironmonger, for instance, chooses stoves up to the full amount specified, after having deducted the 15 or 20 per cent. discount, at the case may be. The contractor refuses to pay the ironmonger the full amount due.

Now, Sir, is this "prime cost" condition a mistake altogether? Is it the business of the contractor and not of the architect and his client?

If some of your readers who have carefully thought this matter out would give us the benefit thereof and also of their experience, I am sure it would be of great value to many young practitioners, and perhaps even to older ones.

* * We should say it is a matter for the contractor. The architect merely names the value as a rough definition of the class of goods he wants.—E.D.

The Student's Column.

GEOLOGY.—XXVII.

GEOLOGICAL MAPS.

GEOLGICAL maps relating to the United Kingdom are of two classes—those made (a) by private individuals, and (b) by the officers of the Government Geological Survey.

Of the former class we have but little to say. They have, for the most part, been drawn up to elucidate the structure of some new or little-known region, and are usually accompanied by some thesis published in the *Journal*, or "Transactions," of a learned society. Such maps, necessarily, are not published on any particular plan, and may be described as a heterogeneous assemblage of useful information dealing with special districts. We find a large number of maps, more or less authentic, referring to mining regions; to tracts of country proposed, or about to be absorbed in some scheme of water supply; to areas affected by certain diseases; and so forth. Then we have general geological maps of the British Isles, for the most part of a rather sketchy nature, and not of much value, except when compiled from the official sources about to be mentioned. Many of these productions of private individuals are of sterling worth, and frequently treat of subjects not adequately dealt with elsewhere; but the majority are comparatively worthless, having been in too many instances drawn up hurriedly, on very imperfect data, to urge the claims of some pet theory.

The work of the Government Geological Survey, however, is of a very different character. As might naturally be expected of an organisation of that kind, there is at any rate a method in everything done; the maps, except in certain cases presently to be referred to, have a distinct relation to one another, and the whole country has been systematically surveyed. In constructing their maps the Geological Surveyors have, with a few unimportant exceptions, used the topographical maps of the Ordnance Survey as a basis, these latter merely having the geological information added to them. The

original field surveys are done on the scale of 6 in. to one mile in those districts where maps of that scale are available; in other parts, maps on the 1-in. scale are used as a topographical basis. The official catalogue states that where the districts contain coal-bearing strata, or other mineral-bearing rocks of commercial importance requiring greater detailed information, the original survey upon the 6-in. scale has, in most instances, been engraved and published. In all cases the geology mapped in the field upon the 6-in. scale is reduced and published upon the 1-in. maps, which then constitute the general geological map of the United Kingdom; and on this scale the whole will be published as each individual sheet is completed.

In addition to the foregoing, a geological index map of Wales, with parts of the adjacent counties, on the scale of 1 in. to four miles, has been published for some years; and we are pleased to note that the same is now being done in regard to the whole of England, the first few index maps having been recently issued. We venture to think that the maps on this manageable scale will be found more useful for general reference than the larger scale maps alluded to, though they cannot, of course, compete with the latter where accurate detailed information is required.

The 1-in. maps of the Geological Survey are of two kinds; those dealing with (a) the general rock masses—called "Solid" maps; and (b) the superficial sands, gravels, &c.—known as "Drift" maps. Before proceeding to describe these we may profitably glance at the class of information conveyed by them, in common with other maps of the Survey; the student will then see in what way they assist the architect and engineer.

It has been laid down as a general principle that the prime object of the Survey is to construct accurate geological maps of the country; and no one will say that, on the whole, the Survey has been found wanting in that respect. At the same time, it must be confessed that the public was not wholly prepared to find that this prime object so absorbed the attention of the officials concerned that many other things which might be legitimately regarded as part of the Survey work, have, at best, received but scant consideration. What is an official geological map, as exemplified by specimens of English production? It is one on which the limits between divers geological formations are carefully drawn, and where distinctions are made between various other classes of rock. It shows by graphic methods the relation in the field between these groups; whether they are horizontal, vertical, inclined, or unconformable to each other; whether thrown into contortions, anticlines, or synclines, and whether faulted or not. It denotes sites where copper, tin, iron, lead, or other useful metal occurs, and gives the outcrop and general position of coal seams, where possible. But it must be remembered that the mapping applies only to what occurs at the surface of the ground, or to the outcrop of the "solid" rocks; for information concerning the structure below the surface, the student must consult the vertical and horizontal sections published by the Survey.

Now, on the face of it, it would seem that these maps are very useful; and so they are to the geologist who contents himself with the philosophical aspect of the science alone; but they are by no means as useful as they might be from the economic standpoint. From the coal-miners' point of view they are, no doubt, excellent; but the engineer is not catered for at all, except in a general way. We have said that the maps show the extent and positions of the outcrops of geological formations and rock masses. We may remind the student that the dividing line between one formation and another is determined not by the change in lithological character of the beds, but by the general facies of their included organic remains. From the purely scientific point of view we have nothing to say to this, which is the fundamental principle governing all stratigraphical geology. But we cannot shut our eyes to the fact that the boundary lines have very little significance from a practical aspect. The engineer wants to know at a glance whether this or that site is suitable for constructing a reservoir upon; whether soils in a given district are porous or impervious; if the ground will permit of an embankment or cutting being easily made; the sites of wells, &c. In other words, he wants a map constructed to show the variations in the character of the solid rocks, so that if a clay passes into a sand, and the latter into gravel, he may have an opportunity of easily ascertaining the fact. We abstain from commenting on the

inestimable boon that would be conferred upon agriculture by such maps, especially were the chemical composition of the soils freely given. Maps of this kind are not impracticable, as witness the efforts of the Russian and Belgian geological surveys.

The maps on the 1-in. scale are published in sheets and quarter sheets. The "solid" edition is, for the most part, done on the old series of the Ordnance Survey, so that whilst they leave but little to be desired from a geological point of view, the topography is frequently very incorrect. The working geologist usually transfers the boundary lines from the old maps to the new, but anyone who has essayed in that direction knows the difficulties of the case. The "solid" edition marks the distribution of rocks beneath superficial deposits, where such exist; the "drift" shows the occurrence of all superficial deposits, as well as the solid rocks where these latter actually crop out. The "drift" edition, which, however, is far from being completed, is much to be preferred as giving more precise information, whilst the topography is more up to date.

A word or two may be said in regard to the scale of our English maps. For working purposes in the field the 1-in. map is too small; all who have practically used the larger scale (from 2.53 to 3.76 in.) geological maps on the Continent will endorse this observation. On the other hand, except for very detailed work, the 6-in. scale is too large. We should not forget, however, that ours is the pioneer Geological Survey of the world, and that others have naturally profited by our experience.

CONCLUSION.

In conclusion, we may remark that geology has played a much more conspicuous rôle in architectural matters than most architects are aware of. Prior to the advent of railways, the character and style of buildings were largely dependent on the local distribution of building material. As Simonin says—"Si Gènes est une ville de marbre, elle le doit aux montagnes voisines de Carrare. Paris est bâti de pierres de taille et de moellons qu'il emprunte à ses carrières, tandis que Londres, qui repose sur l'argile, n'est qu'une ville de briques."

No one will deny that the magnificent Elizabethan structures so commonly found in areas where Jurassic rocks abound, to a large extent owe their presence on the spots where they exist, to the close proximity of good freestone. No one sees such structures, except as a rarity, far away from stone districts. The reason why churches in areas where chalk crops out have been so frequently built of flint is not far to seek; neither is there much difficulty, in face of the abundance of red sandstone in the vicinity, in understanding why such a city—say, as Chester—is so largely constructed of red stone, nor why granite, to the exclusion of almost all other stone, is used in Aberdeen, imparting such a special character to its edifices as to earn for it the title of the "granite city."

But if this is so in regard to mansion-houses and large towns, how much more strikingly apparent does it become in rural districts, where the nature of the ground is imprinted on every hamlet.

OBITUARY.

MR. W. F. WOODINGTON, A.R.A.—On the 24th inst. the death took place of Mr. William Frederick Woodington, A.R.A., in the eighty-eighth year of his age, at his residence, 51, Hayter-road, Brixton-hill, S.W. Mr. Woodington contributed to the Westminster Hall competition for sculpture a model of "Milton and his Daughters." He also executed one of the large reliefs, "The Battle of the Nile," for the pedestal of the Nelson Monument, and subsequently the bas-reliefs for the chapel containing the Wellington Monument in St. Paul's. Among his portrait statues and busts are the six statues of Captain Cook, Sir Francis Drake, Sir Walter Raleigh, Columbus, Galileo, and Mercator, for the New Exchange, Liverpool, executed under the direction of Mr. T. H. Wyatt, the architect. The large marble bust of Sir Joseph Paxton at the Crystal Palace, which measures 8 ft. 6 in. high, is by him, as also a bust of Mr. McDowell, one of the series of portrait busts belonging to the Royal Academy. Mr. Woodington was, besides, a painter, and studied in the life-school of the Royal Academy. Among his pictures exhibited at the Academy were "The Angels directing the Shepherds to Bethlehem" (1853), and "Job and his Friends" (1855).

MR. WILLIAM WATKISS LLOYD.—On the 22nd inst. the death took place of Mr. William Watkiss Lloyd, who died after a short illness, in London. According to the *Times* he was born in 1813, and received his early education at the Grammar School,

Newcastle. In the thirties, when antiquarians were rarer than they are at present, Mr. Lloyd was an acknowledged expert. The result of his wide culture, even at so early an age, first appeared in print in 1845 in an essay upon the Zanlian Marbles, dedicated to Sir Charles Fellows. An interval of nine years followed, during which time he wrote much and published little, if anything. "The Dramatic Works of William Shakespeare, with notes by J. W. Singer, together with the life of the poet and critical essays on the plays by W. W. Lloyd," appeared in 1845. In 1853 Mr. Lloyd was elected to the membership of the Dilettanti Society. He wrote many treatises upon both the architecture and sculpture of the Periclean time, chiefly in journals. In 1865 Messrs. Williams & Norgate published "Christianity in the Cartoons of Raphael referred to Artistic Treatment and Historic Fact." The year 1866 produced "Raphael in the Vatican," an essay upon philosophy, theology, and poetry in the age and the art of Raphael. "The History of Sicily to the Athenian War, with elucidations of the Sicilian Odes of Pindar," was published by Mr. Murray in 1872. "The Age of Pericles" (Macmillan) followed in 1875. The British Museum is to receive into its keeping the entire collection of Mr. Lloyd's published as well as his unpublished manuscripts. Among the latter are a "Further History of Greece," "The Century of Michelangelo," besides invaluable materials and the results of research concerning architecture, sculpture, and painting. His last printed work is upon the central groups of the eastern frieze of the Parthenon. Mr. Lloyd was a corresponding member of the Archaeological Societies of Rome and Palermo. At one time he was a very frequent contributor to the *Builder*.

In later years he only contributed occasionally, but it may interest our readers to know that he was the writer of several articles which have appeared in our columns from time to time during the last few years on the subject of the optical proportions of Greek temples, based on a very careful consideration of minutiae of measurement. Some of these were signed by his name, but some other well-known articles of a similar nature are also his own.

MR. WILLIAM JOHN METTAM.—At the last moment we hear with regret of the death of Mr. Mettam, architect, of Leeds, Associate of the Institute of Architects, and who at the time of his death was President of the Leeds and Yorkshire Architectural Society. Mr. Mettam died from pneumonia following on influenza. His loss is regretted by a large circle of friends in Leeds. As a member of the profession he was active in doing all in his power to uphold a high standard of professional honour.

GENERAL BUILDING NEWS.

RESTORATION OF ST. PETER'S CHURCH, MARKET-BOSWORTH.—St. Peter's Church, Market-Bosworth, has just been re-opened after restoration. An organ has been erected, and the seats of the church have been widened. The work has included the erection of a reredos, the placing of a screen dividing the chancel from the remaining portion of the church, the adornment of the chancel, the erection of a new pulpit, and general repairs to the exterior of the church fabric. The reredos is of oak. The pulpit and screen are also of oak. The upper portion of the pulpit is divided into four niches, with cusped and canopied heads, the spaces between being diapered. The niches between contain statues representing Moses, Elijah, St. John the Baptist, and St. Peter, the Patron Saint of the Church. The chancel screen is an arcade of five bays with tracery and carved and moulded cornice and cresting, the centre portion being raised above the rest, and is finished with a cross flanked by two angels bearing scrolls. Other work on the church includes the clearing off the plaster from the chancel walls, and re-pointing throughout, reinstating the stone-work, excavating for and forming chamber under the organ, fitting up the chancel with wrought-iron gas-pendants, and the provision of a carved Litany desk. On the exterior, all the fabric walls and tower have been repointed, and a drainage and gutter of concrete have been placed round the foundation of the church. The work throughout has been executed from the designs and under the superintendence of Mr. Chas. E. Deacon, architect, of Liverpool, by the following:—Carved work in reredos, organ, screen, pulpit, &c., and the stone statues, by Messrs. Harry Hems & Sons, of Exeter. The organ, by Mr. Porritt, of Leicester. The general restoration of the walls, &c., by Mr. Beck, of Market-Bosworth. The gas pendants were supplied by Messrs. Singer & Sons, of Frome. The marble and mosaic work by Messrs. Swift, of Liverpool, and the white silk altar frontal by Messrs. Thos. Brown & Son, of Manchester.

TRUANT SCHOOL, LICHFIELD.—The Midland Truant School at Lichfield, situated on Beacon Hill, is to be opened next week. The school has been erected to receive 100 truant boys, with school rooms, dormitories, and every requisite accommodation. In connexion is a house for a resident superintendent and matron, and provision for three masters and servants to live on the premises. The architect is Mr. R. Stevenson, of Burton-on-Trent, whose plans were placed first in an open competition. The contract for the building amounted

to 11,565*l.*, and the buildings have been upwards of a year in course of construction. The contractors were Messrs. Thomas Lowe & Sons, of Burton-on-Trent. The clerk of works has been Mr. Joseph Rice, of Burton-on-Trent. The building is in the Renaissance style. The principal portions of the premises are three stories high, and the roofs are covered with slate and red-tiled gabled tiles. The building stands about 70 ft. from the road, is 142 ft. 6 in. by 145 ft. 9 in. in area, and is to have a front boundary wall of Derbyshire grit-stone. The building is approached by a large entrance hall, with dining hall on one side and school-room and class-room on the other, and immediately opposite is a board-room or superintendent's office. Within easy distance are dressing-rooms, lavatories, and swimming-bath for the boys. Three rows of sprays are erected, each row accommodating sixteen boys. The swimming-bath is 19 ft. by 10 ft. in measurement, and rises from 3 ft. 6 in. to 4 ft. in depth. This is heated by a low pressure circulating boiler. Beyond is situated a sailors' shop, 20 ft. by 20 ft. Near the tailors' shop is the receiving department, fitted up with bath, fumigating and disinfecting oven, and clothes store, where the old clothing is stowed away. On the first floor are three dormitories, two 50 ft. by 20 ft. each and one 25 ft. by 18 ft., and four more, each 25 ft. by 18 ft., all supplied with inspection windows. On the second floor an infirmary is constructed, and it comprises day and sick wards and nurse's room. Connected with the institution is a laundry, 26 ft. 3 in. by 16 ft., which is fitted with Bradford's patent clothes-horses and heating chamber, and supplementary to modern appliances. On the south side of the building are the kitchen, scullery, stores, servants' hall, servery, needle room, &c. To the front of the building on the same side, at the corner nearest to Lichfield, the superintendent's house is situated. Adjoining the lower rooms of the house is the officers' mess room, fitted with an inspection window. Under the domestic offices is a large room, heating the building and a steam boiler for the cooking apparatus in the kitchen. At the back of the school is an asphalted drill-yard about 100 ft. square, with a covered drill-shed 48 ft. by 18 ft. at the end. In connexion with the schools an isolated hospital for infectious diseases has been erected on the north side of the ground. It provides for four beds, and consists of sick and day wards, bath-room and lavatory, nurse's room, kitchen, store, &c. The whole of the school buildings are heated by hot water on the low-pressure system, while in the dining-hall and school-rooms open fire-grates are provided. The hall and dormitories are supplied with radiators, and the foul air from the main side of the ground. It provides for four beds, and consists of sick and day wards, bath-room and lavatory, nurse's room, kitchen, store, &c. The contractors for the various fittings have been as follows:—Heating and cooking apparatus, Messrs. Newton, Chambers & Co., Sheffield; fit lavatories and sanitary appliances, Messrs. B. Finch & Co., London; laundry requirements, Messrs. Thomas Bradford & Co., Manchester; locks, &c., Messrs. J. M. Harlow & Co., Burton-on-Trent; and furniture, Mr. A. R. Denn, Birmingham.

CONSTITUTIONAL CLUB, HARLESDEN.—The new quarters of the Harlesden Constitutional Club, situated at St. Michael's-road, in the 13th ward, East End, Cadogan. The new building contains a concert-hall, capable of seating 500 persons. A fixed stage has been erected in the hall, together with dressing-rooms. To the left of the entrance is a reading-room; while the upper rooms are set apart for the various social needs of the members, also for the use of the office. Billiard-rooms have also been provided. The total cost of the buildings and fittings is 4,000*l.*, Mr. Shaw being the architect.

INFANTS' SCHOOL, LLANDAFF.—The Bishop of Llandaff recently opened the new infants' school erected in contiguity to the Llandaff National Boys' and Girls' Schools. The new school is a stone building, and was erected by Mr. J. W. Roger, contractor, after designs prepared by Mr. Halliday, architect.

CLUB BUILDINGS, WOLVERHAMPTON.—A working men's club is being erected in North-road, Wolverhampton. Messrs. C. Manton & Sons, of Chapelash, Wolverhampton, are the architects. Messrs. Jones & Attwood, engineers, of Stourbridge, will supply the heating apparatus, and Messrs. Butler Brothers, of Wolverhampton, are the contractors.

BUILDING WORK IN ABERDEEN.—Although the various industries in Aberdeen have, as a rule, experienced depression during the past year, the building trade has met with busy times. A great many tenement dwelling-houses have been erected, chiefly in the western and north-western suburbs, and also in what is practically the new town, on the south side of the river Dee. Among the more prominent public buildings at present going on are the following:—New police buildings, Lodge Walk; hospital at Royal Lunatic Asylum; administrative block, Royal Infirmary; electric lighting station, Cotton-street; extension of City Hospital, Park-road and Victoria; Salvation Army Citadel, Castle-street; new Baptist Church, Gilmont Park; new Holburn Free Church, Great Western-road;

additions to Nazareth House Industrial School and House of Refuge, Claremont-street; newspaper office, Broad-street; extension of Marischal College; additions at the Blind Asylum, Huntley-street; ditto at Deaf and Dumb Institution, Belmont-street; and the extensive additions at the Trinity Hall, the property of the Seven Incorporated Trades. The following is the best indication that can be made of the plans of new buildings sanctioned by the Town Council during the year from January to December inclusive:—Blocks of shops and dwelling-houses combined, 15; dwelling-houses alone, 166; cottages, 7; workshops, factories, and warehouses (including several rebuildings after fires, &c.), 30; alterations and additions on premises of various descriptions, 57; churches, public halls, schools, &c., 14; and miscellaneous, 28. What are described as "dwelling-houses" will accommodate on an average six families. As a family averages five, provision would thus be made for upwards of 5,000 persons. The population of the city, however, increases at the rate of about 2,000 only per annum; and as the Borough Assessor in April reported as vacant houses for 923 families, it is evident that, although 170 tenements were closed by the public health authorities as uninhabitable, new house-building is being overdone, and a lull is likely to ensue in that department after the removal term in May next. In the monumental and ornamental granite works trade has been doing very well, and has been able to find employment in the construction and other causes in America, from which a large demand used to come, granite merchants had to pay off a considerable number of hands, while numbers of workmen who had emigrated to the United States had to return to Aberdeen as poor as they went, work having fallen off on the other side of the Atlantic. A good many men obtained employment by the Town Council in connection with the new gasholder, but their task is now about completed, and unskilled labourers generally find difficulty in getting work. The Tramways Company intend to double the line in the George-street section where the width of the street admits, and to extend the High-street line to Old Bridge-street, and have deposited a private Bill in Parliament for the requisite authority. The 35,000*l.* scheme for new promenade, electric tramway, and new pavilion in connection with the sea-bathing station has collapsed, and a much smaller affair—pavilion, &c., to cost about 3,000*l.*—is now proposed.

RENOVATION OF SHIPLEY CHURCH, SUSSEX.—At a recent meeting of the building committee of the proposed new Church of St. Saviour, Barton, it was finally decided that Mr. R. Knill Freeman, of Bolton, and Surveyor of Ecclesiastical Dilapidations for the Diocese of Manchester, should be appointed architect for the building, and that the necessary funds should be raised by a view to commencing building operations as soon as possible in the year 1894. The new church is estimated to cost about 5,000*l.*, and is being erected to take the place of the old one. The seating accommodation provided will be for 420 persons.

RESTORATION OF SHIPLEY CHURCH, SUSSEX.—The Parish Church of St. Mary, at Shipley, has just been re-opened after restoration. The restoration has been carried out from the designs of Mr. J. L. Pearson, R.A., the contractors being Messrs. Cornish & Gaymer, of North Walsingham. The whole of the stonework has been overhauled and repaired, the north aisle pulled down and rebuilt, a new vestry has been added on the north side; and the whole of the outside walls stripped of the rough cast, and the stonework repointed. Much plaster has also been removed from the interior, and the Norman work and corbels of the tower arches have been revealed. The church now possesses an oaken roof; and the seating throughout is also in oak, with Gothic carving on the ends. A carved oak pulpit and a brass lectern have been presented.

SANITARY AND ENGINEERING NEWS.

PURIFICATION OF THE MERSEY AND IRWELL RIVERS.—The Stockport Corporation have commenced to enter into contracts for carrying out the works of the extensive scheme for intercepting sewers to divert and treat the whole of the sewage of the borough, to prevent the same polluting the river. The main sewer of the works is 7 ft. diameter, to be laid at from 15 ft. to 60 ft. below the surface of the ground. The sewers will skirt the rivers along the valleys of the Mersey and the name with the sewage, except a portion of the outfall, which will be on the left bank of the Mersey. The works of the outfall will consist of eight large reservoirs, into which the sewage will be pumped from the main sewer, about 17 ft. in height, and afterwards passed through some seventy-five acres of land, which will act as a filter, on which the effluent sewage from the tanks will be applied, until eventually it is allowed to flow into the river. The whole of the structural works are estimated to cost 95,000*l.*, exclusive of land purchase. Mr. A. M. Fowler, M.Inst.C.E., of Manchester, is the engineer for the works, and Messrs. T. & W. Meadows, Stockport, have provisionally obtained the contract for the first section of the sewer at the sum of 33,000*l.*

SEWAGE DISPOSAL, BIRKDALE, LANCASHIRE.—On the 20th inst., at the Birkdale Town Hall,

Major-General C. Phipps Carey held an inquiry on behalf of the Local Government Board into the application of the Birkdale Local Board to borrow 11,000*l.* for the purpose of surface drainage and sewage disposal. The original scheme propounded by the Local Board was to deal with the sewage by precipitation in tanks by the "infiltration" process, and to turn the effluent on the seashore south of the Palace Hotel near low-water mark. This was opposed by the property-owners in the locality and by the Southport Corporation, and to meet this opposition it was agreed that land should be obtained for the treatment of the effluent, and that then it should flow into Fine Jane's Brook as before. Eight acres of land were secured, but this being found unsuitable the site was changed and eleven acres of higher ground substituted. The surface water would be discharged by a separate system on the foreshore. The total cost of this work was put down at 21,000*l.*, and in May last the Local Government Board had granted the Board permission to borrow 10,000*l.*, leaving the 11,000*l.* now applied for.

FOREIGN AND COLONIAL.

FRANCE.—Mr. Hunt, the well-known American architect, has been elected a foreign corresponding member of the Académie des Beaux-Arts, in place of M. Matkoff, who has died abroad. M. Mercie has been definitely selected as the sculptor for the monument to be erected to Gounod, in the Park Monceau. M. Fournigé has been commissioned to undertake the architectural portion of the work, which will be commenced immediately. M. Jules Chéret has submitted to the committee for the decoration of the Hôtel de Ville an interesting design for his design to be the sculptor for the rooms. The two principal compositions symbolise the Comedy of Molière, and the principal personages in Pantomime. M. Cavelier, the sculptor, who is eighty years of age, has received dangerous injuries from a fall. The Municipal Council of Paris have just inaugurated a lying-in hospital in the Rue de Tolbiac, this new establishment, which is to be called the Asile Michelet, has been built after the plans of M. Bouvard. M. Georges Berger, Deputy for the Seine district, is shortly to address an "interpellation" to the Chamber of Deputies relative to the construction of the proposed Gardes Invalides, which has occasioned so many protests among architects. M. Berger proposes, in order to avoid destroying the harmony of the Esplanade des Invalides, to form the new station either in the old Imperial stables of the Quai d'Orsay, or on the site of the tobacco manufactory not far from there. If this latter project were accepted, the headquarters of the State railway lines would also be established on the same site.

Mme. d'Ennery has presented to the State a splendid collection of objects of Chinese and Japanese art, consisting of about 5,000 pieces. An International Exhibition of Paper-making and Paper Industries is to be held next year at the Palais de l'Industrie, from July 23 to November 23. Applications for space will be received up to March 31. At the Ecole des Beaux-Arts judgment has been given on the competition called "Des Architectes Américains." The first prize has been awarded to Mr. Bigot. Important works for the construction of new abattoirs on the left bank of the Seine are to be undertaken at the commencement of the new year. The cost of the work is estimated at 3,500,000 francs. The Louvre Museum has received a fine picture by the elder Breughel, known by the title of "La Chaine des Aveugles." It was purchased by the Direction des Musées Nationaux, at a public sale at Antwerp. The Municipality of Saint Sauve, near Valenciennes, has commenced the erection of a monument to the memory of Mme. Duchesnoy, the celebrated actress, who was born in that village, in 1777. The Sévres Museum has received two vases in "terre noire" found in the neighbourhood of Haraga, the legendary birthplace of Zoroaster. These appear to be very rare specimens of Persian work of the fifth century B.C.—The death is announced, at the age of sixty-eight, of M. Léon Bousso, for a long time one of the chiefs of the "Maison Goupil," now directed by his son and son-in-law, MM. Bousso and Valodon. He was intimately connected with the artistic movement of the last forty years. In regard to painters he was a far-seeing commercial agent, and with no aesthetic prejudices of any kind.

GERMANY.—The Vereinigung Berliner-Architekten has decided to arrange a "Congress" of church architects for Easter next, to decide on questions of plan suitable for the modern requirements of the Lutheran service. A number of well-known ecclesiastical will be invited to attend the Congress, and there will be an exhibition of the designs of churches erected in Germany during the last decade. The systematic reconstruction of the old wooden bridges over the Spree has been continued at Berlin this year as in 1892. The two bridges to be taken in hand next are the historical "Weidendammerbrücke" and the "Oberbaumbrücke," the former of which crosses the river in the line of the Frederick-Strasse—i.e., the Berlin "Oxford-street." Of the bridges crossing the canals, the most important one to be rebuilt next is

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*Bridging Works, &c.	Working Local Board.	500, 250, 100, and Four of 50 each.	Jan 1794
*Public Hall, L. Henry, &c.	Kirkcaldy T.C.	500, 300, 200.	Mar. 17
*Branch Public Library	Bull Corporation		No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Collecting &c. Dust and Ashes	Acton Local Board.	Official	Jan. 294
*Kiln and Pavement, Palace street	Sale Local Board	A. G. M. Heath	Jan. 3
*Extension of Business Premises, High street, Brighton	Collector's Local Board	G. E. Butcher	do.
Road Works, Materials, &c.	Ed. of Northumberland	R. Davies	do.
The making of Queens' Cross-road, Parkstone	Police Town Council	A. J. Ware	Jan. 4
Infectious Diseases Hospital, East Pilton	Leth Town Council	Mr. Simpson	do.
Sewerage, Paving, &c. P. ways	Truro Local Board	H. S. Batey	Jan. 5
Road Materials, &c.	Bognor Town Council	Chas. Adcock	Jan. 6
*Works and Materials	St. George's, Bournemouth	G. Livingstone	do.
Cast-iron Pipes, 8 in. dia.	Newbury Town Council	J. Amble	Jan. 8
Recessed and 10 in. dia.	Leamington Corp.	Mr. de Normanville	do.
*Pip. Laying, &c. (see notice)	Kilmarnock N. B. Corp.	J. Wilson	do.
*Sewerage and Laying Paving	W. Dwyer	do.	Jan. 9
*G. W. R. Co., Liversham Station, Dorset	Greenwich Bd. of Works	Official	do.
*Workshop Stone	Greenwich Bd. of Works	do.	Jan. 10
*Rectory Buildings, Mablethorpe, Lincs.	Rev. D. E. Whitlaw	W. A. Hills & Son	do.
*General Works	Poplar Union	do.	Jan. 11
*Paving, Sewing, &c. (see notice)	Pontypridd Local Bd.	Elmd. Rees	do.
*Roads and other Roads	do.	do.	do.

CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Cast-iron Pipes, Irregulars, &c.	Rochester, Chatham and Strand Gas Co.	W. Syms	Jan. 1
Sunlight School Buildings, Hall, & Swan	Rev. J. E. Leuty	do.	Jan. 12
Public Rooms, Barmouth	W. C. Oliver	do.	Jan. 14
Sinking Well, &c. Chichester	West Sussex County Council	Official	Jan. 15
*Materials and Plant	Luton County Council	do.	Jan. 16
*Refresher House, Highgate	Southport Corp.	do.	do.
Staircase, &c.	Mansfield Corp.	G. Hudson	do.
Sinking Well	do.	do.	do.
Spire House, &c. for Coast Guard	Admiralty	Official	Jan. 19
Asylum at Whitworth, near Newport	Isle of Wight County Council	B. S. Jacobs	Jan. 23
*Gas Engineering and Fittings	West Ham Sch. Bd.	Newman & Jacques	do.
School Building and Roadwork	St. Vincent Sch. Bd.	J. Gilman	Jan. 24
*Boundary Walls, &c.	Carleton Sch. Bd.	W. C. Way	Jan. 25
*Sewerage Works	Keynsham R.R.A.	C. N. Lailey	Feb. 6
Blackpool	do.	R. Gort & Son	No date
Residence, Grosvenor, St. Thomas	J. Langdon Thomas	Jas. Crocker	do.
Twelve Dwelling houses, Henrietta-street	Ashton & under Lynn Town Council	J. Eaton & Sons	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be received by
*Surveyor	St. Mary Stoke Newington Vestry	£600	Jan. 5
*Surveyor	Beckenham Loc. Bd.	£500	Jan. 7
*Mill Foreman	London County Council	£400	Jan. 15

Those marked with an Asterisk (*) are advertised in this number. Competitions, pp. iv, v, vi, and viii. Public Appointments, pp. xx and xxi.

the Potsdamer bridge, which is also situated on a main artery.—The Kroll Bier Gardens and Assembly Hall, which for many years have been the scene of some of the finest classical operas, will not be further used as an opera house, but only for the purposes of a new synagogue at the cost of about 15,000*l*. A competition has been opened for the design. Three premiums of 135*l*, 85*l*, and 50*l* will be given, and four months allowed for the preparation of the drawings.—At Strasburg a technical middle-class school has been founded, with four independent departments. The first division is technology generally; the second for road and dyke building, and the fourth for land surveying.

SWEDEN.—A large new municipal school has been completed in Stockholm, the cost being 434,000 Kr. The new "village town," Djursholm, a suburb of Stockholm, is rapidly being covered with modern residences in English style, sixty having already been completed. A large number have been built by architects and artists, who appear to particularly favour the new suburb, one of the most striking structures being that of Herr Fr. Liljekvist, a prominent architect. The quarter will shortly be in communication with the city by an electric tramway.—A statue of Nils Ericsson, once Lord Protector of Sweden, was unveiled recently by King Oscar. This makes the twelfth statue in the open squares of the Swedish capital.—The leading organ, the *Frithiof*, in an article on the "Riches of Sweden," calls upon builders and architects to use more extensively native stones, as, for instance, granite, porphyry, and gneiss, in their operations in preference to foreign materials.—The brick and tile industry of Sweden is year by year growing in extent. The clay for the manufacture is only found in the province of Scania, along with the anthracite coal deposits there; this province being the southernmost in the country.

NORWAY.—The erection of the new national theatre in Christiania is progressing very slowly indeed. At the present rate of progress several years must elapse before the building can be finished. As yet only the pile-driving and part of the excavations for the foundations have been carried out.—Funds are being collected by "Norwegian artists" for the erection of an art exhibition building—i.e., a kind of *Salon*, in Christiania. Recently the fund has been enriched with a legacy of 80,000 Kr., so that the building may now be soon commenced.—In the competition for the building of a new municipal church at Oslo, the first and original part of Christiania, the first premium, 1,500 Kr., has been awarded to Herr H. S. Larsen and Herr H. Jürgensen, architects, for the best design. These two gentlemen having collaborated. The second premium, 1,000 Kr., was divided between two other competitors; there were twelve in all. Two important municipal churches have of late been completed in Christiania—viz., those of Paulus and Sagene. The former, constructed by the Crown architect, Herr H. Bull, was commenced in 1889. It is built in the form of a cross, with

chapel adjoining the principal aisle. The exterior is entirely faced with red tiles from the factory at Porsgrund. The roof and spire are covered with grey Norwegian slates, whilst all detached columns externally are cut from grey Ideford granite, with bases and capitals of sandstone from Throndhjem. The cost of the edifice is 200,000 Kr. The style is of course Gothic. The Sagene church is situated in the northern and poorer part of the city, and is a less imposing structure than the former. Eleven designs were sent in under the public competition, and the first premium and the commission awarded to Herr Chr. Fürst, architect, of Christiania. Here, too, the style is Gothic, and this edifice is also built in the shape of a cross, with one large and four smaller spires. The church was commenced in 1888. In the construction the same materials as in the Paulus church have been employed, and the cost has also been the same—viz., 200,000 Kr.—A novel structure has been added to the sights of Christiania in the shape of a great square "tower," erected on the premises of the Telephone Company. The frame-work is of iron, and the height 40 ft. It is capable of receiving 8,000 cables. It has been designed by Herr Bull, the Crown architect.—In connexion with the new Custom-house, now in course of erection in Christiania, the harbour board has appointed a commission to deal with the question of constructing a series of new quays along the sea-shore.—The great gable group which is to ornament the front of the Christiania University is now being cast in bronze, the sculptor being Herr Skjelbrek, a rising young artist.—A new museum in the Gothic style has been completed in the town of Stavanger. The architect is Herr Eckhoff, and the cost has been 90,000 Kr.—The Bricklayers' Union of Christiania has held a mass meeting, protesting against the introduction of Swedish labour whilst Norwegian bricklayers are starving, and calling upon builders only to employ the latter.—A house of business in Christiania has been faced externally with Norwegian marble in various colours, the effect being very striking. Some of the stone resembles dark-red sandstone. This is the first use of native marble on a large scale.

MISCELLANEOUS.

THE UNIVERSAL TWENTY-FOUR HOURS' MOVEMENT.—The progress of the movement for "universal time" all the world over has been exceedingly slow; but it has advanced another step. Since November 1 the time used on the Italian railways (and probably, therefore, throughout the country) is that of a meridian exactly one hour east of Greenwich. Since May 1 the standard time in Germany depends upon the meridian one hour east of Greenwich. A Bill is before the Austrian Parliament to make the standard time in Austria the same as that in Germany and Italy. In Sweden the time in use is almost the same. Belgium and Holland have adopted the English, that is the Greenwich time. In Australia the Postal Conference has passed a resolution that it would be advisable to use one time—namely, nine hours fast on Greenwich. In

the United States and Canada the territories are divided into hourly zones, in each of which the time in use is respectively four, five, six, seven, or eight hours slow on Greenwich time. Italy has also arranged to use the twenty-four hours' system of time notation. It is now twenty-six years since watches and clocks had their dials made to carry out this in Britain and France, yet it has never been adopted.—*Full Mail Gazette*.

NEW ORGAN, WELSH PRESBYTERIAN CHURCH, LIVERPOOL.—The Welsh Presbyterian church, Prince's-road, Liverpool, which was built some twenty-five years ago from the designs of Messrs. W. & G. Audsley, is now being additionally ornamented by having an organ fixed, which will be shortly completed. The organ is placed behind and continuing at the sides of the pulpit, and is formed in two projecting bays, the centre portion recessed in a curved sweep, and is constructed on a gallery supported by ornamental columns and brackets. The front of the gallery is designed to correspond with the existing gallery fronts. The side bays have the pipes arranged to form gables and towers, relieved with pitch-pine casing, and pinnacles with turrets, and carved gilded capitals, while over the centre portion or canopy the pipes are arranged in triplet gables, with the casing in oak, and ornamented with pinnacles and carved capitals. The whole is designed so as not to obstruct the large tracery window behind. The hydraulic engines, with bellows, are placed in the vestry at the rear; the former is worked by water supplied from the Liverpool mains. The specification of the organ was prepared by Mr. W. A. Roberts, organist to St. Paul's Church, Liverpool. The organ builders are Messrs. Norman Bros. & Beard, Norwich; the gallery and case is being executed by Messrs. Brown & Backhouse, contractors, Liverpool, from the designs and specification prepared by and under the supervision of Mr. T. G. Williams, architect, of Liverpool. The hydraulic engines are supplied by Messrs. Melvin & Sons, Glasgow. The total cost will be about £600.

HUBBARD'S BRICK COMPANY, LOWESTOFT.—We understand that this company (which was floated by George Fitt & Co., of Norwich, two years since), at its annual meeting a few days ago, declared a dividend of 10 per cent., after allowing 10 per cent. for depreciation and carrying forward a sum equal to 1½ per cent. on the share capital of the company. This shows the total net earnings of the company to be 3½ per cent., a very satisfactory result, after taking into consideration the great advance in coal, and a considerable sum spent in preliminary expenses and permanent improvements.

ROYAL SOCIETY OF PAINTER-ETCHERS.—The President and Council of the Royal Society of Painter-etchers have decided to hold their next exhibition from March 12 to April 7, 1894. A selection of the engraved work of Marc Antonio will be a feature of the exhibition. It has been further decided to hold the election of Associates on Friday, January 5, 1894, at 5 p.m.

ANNUAL DINNER, SOUTH SHIELDS MASTER BUILDERS.—On the 20th inst., the annual dinner of

BOURNEMOUTH.—For the construction of a new central drive 1,000 ft. long, at the Park, and other works in connexion therewith, Mr. F. W. Lacey, Borough Engineer and Surveyor :—
B. Cooke & Co. £3,150 0 0 F. Reeks (accepted) £1,850 19 1
G. T. Budden 2,000 0 0 C. Stickland (in-
formal) 1,450 10 0
W. H. Saunders & Co. 1,975 9 6 [Surveyor's estimate, £2,000.]

DEVONPORT.—For the construction of 8,000 lineal yards of sewers, &c., for the Town Council. Messrs. Moseley & Anderson, architects, Goodyear Chambers, Northampton. Quantities by the architects—
 J. Garrett £157 10 C. W. Abbott £495 10
 J. B. Clarke 630 0 T. Pigott 470 0
 H. Dorman 607 0 S. Knight 469 10
 J. Sharnham 572 0 Tebbutt & Pratt 469 10
 W. Henson & Son 520 0 F. Johnson & Son, Esq. 469 10
 T. & C. Berrill 532 0 Barton (accepted sub-ject to alterations) 466 10
 W. Berrill 532 0 [Architect's estimate, £515.]

KING'S LYNN.—For the construction of sewers, Church-street and Priory-lane, for the Corporation. Mr. E. J. Silcock, C.E., Borough Surveyor, King's Lynn—
 H. Colson, King's Lynn, Esq. 14 S. Hipwell £390 0
 [Engineer's estimate, £600.]

LEEDS.—Accepted for the erection of seven stables, making chain, &c., Mr. C. H. Thornton, architect, Commercial-buildings, Park-road, Leeds—
 Joseph Pullan, Beeston Hill £171 10 0

LLANDUDNO (N. Wales).—For the construction of a boat jetty, for the Improvement Commissioners. Mr. E. P. Stephenson, Engineer, Commissioners Office, Llandudno—
 Ed. Thorpe & Son £598 0 0 R. L. Roberts, Llan-jno, Weston 550 2 1 dudno (accepted) £527 0 0

LONDON.—For the reconstruction of the drainage and sanitary arrangements at the Hopkin Almshouses, Holland-street, Blackfriars, S.E., for the trustees. Mr. Arthur W. Tribe, surveyor, 91, Clapham-road, S.W.—
 Galpin £220 J. Moyle £178
 Hoare & Son 198 Whitehead & Co., Clap- Baguley 198 ham (accepted) 160

NORTHAMPTON.—For the erection of shoe factory and offices, for Messrs. C. & E. Lewis. Messrs. Moseley & Anderson, architects and surveyors, Goodyear Chambers, Northampton. Quantities by the architects—
 F. Johnson & Son £1,912 10 J. W. Wallis £2,100 0
 G. F. Sharnham 9,000 0 J. Garrett 2,550 0
 Green Bros. 2,850 0 J. B. Clarke 2,500 0
 A. P. Harwin 2,850 0 W. Gregory & Son, 2,497 0
 H. Martin 2,850 0 Northampton* 2,497 0
 W. Heap 2,750 0 [Architect's estimate, £3,650 0 0.]

NORTHAMPTON.—For extension of factory, for Messrs. Marlow & Sons, shoe manufacturers. Messrs. Moseley & Anderson, architects, Goodyear Chambers, Northampton—
 H. Martin £882 E. Archer £240
 J. T. Wingrove 864 A. P. Harwin 230
 J. Duncroft 260 J. Garrett, Northampton* 219
 Green Bros. 254 [Accepted.]
 [Architect's estimate, £240 0 0.]

ROTHERHAM.—For the erection of vestry offices, Moorgate-street, for the overseers. Mr. Edward Hutchinson, surveyor, 18, Howard-street, Rotherham. Quantities by architect—
 Geo. Pugh £1,420 Chas. Green 1,844
 Robt. Snell 1,390 A. T. Ripley 1,180
 Chadwick & Co. 1,193 Messrs. W. Thornton & 1,180
 G. H. Smith 1,230 Sons, Glasgou-st., 1,175
 W. Bell 1,272 Rotherham* 1,175
 Richd. Snell 1,247 [Accepted.]
 [Architect's estimate, £1,350 0 0.]

SHADFORTH (Durham).—For the construction of sewers and sewage purification works at Ludworth Colliery, in the Township of Shadforth, for the Durham Rural Sanitary Authority. Mr. Geo. Gregson, Surveyor, Western Hill, Durham. Quantities by the Surveyor—
 John Carrick £350 0 0
 Thomas Mannen, Durham (accepted) 334 0 0
 [Surveyor's estimate, £315 15 2.]

SHEFFIELD.—Accepted for the construction of iron escape staircases, &c., at the workhouse, Fir Vale, for the Union Guardians. Mr. W. H. Ward, architect, Paradise-street, Birmingham—
 Moorwood & Sons, Sheffield £3,157 1 3

SHEFFIELD.—Accepted for additions, &c., to school buildings at the workhouse, Fir Vale, for the Union Guardians. Mr. W. H. Ward, architect, Paradise-street, Birmingham—
 George Carr, Sheffield £2,895

STOCKPORT.—For the construction of an intercepting sewer, &c., alongside the river Mersey, for the Corporation. Mr. A. M. Fowler, C.E., 1, St. Peter's-square, Manchester. Quantities by Messrs. Hurrell & Taylor, Manchester—
 Leak & Co. £55,664 5 0 Prescott £40,557 0 0
 D. Shanks 49,884 3 3 Kirk, Knight, & Co. 39,970 0 0
 Lee & Thomas 47,551 6 D. Radde 39,175 0 0
 G. Bell 44,933 13 8 Kellett 38,368 0 0
 S. & E. Bentley 43,718 0 0 T. & W. Meadows 33,500 0 0

WHITBY.—For converting Wesleyan Mission Chapel, Flower gate, into public offices for the Local Board. Mr. Thomas Keat Scott, architect, 2, Albion-terrace, Whitby—
 John White £735 0 0 Wm. Langdale & Son 724 0 0
 Charles Winterburn 459 0 0 Bategate, Whitley, Esq. 445 0 0
 Robinson Harland 448 10 0 [Accepted.]

WINDSOR.—For widening and improving St. Leonard's-road, and St. Mark's-place road, for the Town Council. Mr. Thom. J. Division, Borough Surveyor, Windsor—
 Adams £77 3 4 Lee £295 8 0
 G. Pither 340 0 0 A. Revell 274 0 0
 Free & Son 319 0 0 T. Kelly, Windsor* 244 0 0
 E. Knapp 297 0 0 [Accepted.]

WOLVERHAMPTON.—Accepted for the execution of sewerage works, New Bridge District (contract No. 8), for the Corporation. Mr. R. E. W. Harrington, Borough Engineer, Town Hall, Wolverhampton—
 R. Holloway, Wolverhampton £4,349 0 0

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